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ABSTRACT

This set of research materials incorporates information for teachers, principals, students, lecturers, and actively involved parents. Included are leaflets and brief reports designed for private study, staff meetings, inservice courses, or small group discussion. The package contains 15 research studies: "Modified Sports: Kiwi and Aussie" (Velma McClellan, Julie Leibrich, Jennifer Bradshaw, and Jenny Neale); "IQ Tests and Cultural Distance" (James Flynn); "School Climate: Assessing and Improving School Environments" (Darrell Fisher and Barry Fraser); "School Level Equipment Questionnaire (SLEQ)" (Darrell Fisher and Barry Fraser); "Size, Costs, Curriculum in Secondary Schools" (Phillip McKenzie); "Education and Employment" (Paul Callister); "Good and Bad in Prime Time TV for Kids" (Mark Dewalt); "Girls are Better than Boys?" (Tony Gallagher); "Small Children Solve Big Problems" (Lyn English); "Increasing Meta-learning Part 2: Thinking Books" (Susan Swan and Richard White); "Finding Your First Job: From College to Classroom under New Rules" (Marie Cameron, Lexie Grundoff, Marilyn Gwilliam, Roger Peddie); "Weather and Wickedness" (Bill Badger and Eric O'Hare); "Lessons from Mrs. A. and Mrs. P" (Phillipa Lane); "Teenage Perceptions in a Still Nuclear Age" (Greta Barnhart-Thomson); and "I Only Think of the Men...I Don't Think of the Women" (Adrienne Alton-Lee, Prue Densem, Graham Nuthall). (LL)

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SP 033 185

RESEARCH INFORMATION FOR TEACHERS

set research information for teachers

number two 1990

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Item 1

Research information for everyone interested in education: teachers, principals, students, lecturers, actively involved parents...

Leaflets and brief reports designed for a quick read, private study, staff-meetings, inservice courses or small group discussions.

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set research information for teachers
number two 1990

MODIFIED SPORTS
KIWI AND AUSSIE
The schools' experience of the programme

Velma McClellan,
Julie Leibrich,
Jennifer Bradshaw,
Jenny Neale
Wellington

Nicola Bel-ham

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'THEY WERE PLAYING **New Image Rugby**. The two teams were real mixes. Girls and boys, big and small, old hands and learners, able and not so good. Both sides had players who were playing "real" netball and "real" rugby at representative level outside the school. The children were unquestionably fit, and the referee (the principal) was not in too bad a condition himself, although he looked somewhat hot and bothered in comparison with the players. The level of skill was very high among both boys and girls. Chatting with the young players after the game it became clear that in no way did they see it as inferior to the parent game. They described **New Image Rugby** as improving their skills for their extra-curricula sporting activities, which, interestingly enough, were not confined to just one or two sports.'

One of our research team made these observations in a provincial city school where 11- and 12-year-olds were playing. **New Image Rugby** is the second most popular KiwiSport.

The most popular KiwiSport is **Kiwi Cricket**. We found that over three-quarters of all New Zealand primary schools are playing **Kiwi Cricket** and very few schools who had tried it had given it up. Both children and teachers find the equipment a positive incentive to play; it is colourful, easy to use, non-harmful and, most important, durable. The modified rules, as in **New Image Rugby**, as in all Aussie Sports and KiwiSport, allow children of all sorts to take part with great enjoyment; skills increase all round; children who are excluded from 'real' games because they are too small, or the 'wrong' sex, or unskilful, or uncompetitive by nature, join in without ruining the game, they have a lot of fun, and gain in fitness.

The KiwiSport programme was closely modelled on its Australian counterpart, Aussie Sports, but adapted and developed for New Zealand conditions. The differences in the sports, the rules, and the equipment are few but the programmes have, in the past, been delivered and promoted in quite different ways. For a primary school population of 400,000 New Zealand has had 14 KiwiSport Regional Co-ordinators. Australia started with only 9 Co-ordinators but very recently boosted its full state and regional staff to 64.

Background

KiwiSport was launched by the *Hillary Commission for Recreation and Sport* in May 1988. The programme was introduced in response to two government reviews. Both said young New Zealanders should be encouraged to participate in healthy and educational physical activity. Although various modified games were taught at that time most were organised on a fairly ad hoc basis. Sport, in the traditional sense of the word, was viewed by some educationalists as inappropriate for primary school children, so younger children's sporting experience was, to a large degree, limited. If they played sport it was largely because of their parents' judgment and initiative. The Sports Inquiry Committee in 1985 was concerned that children were being encouraged to specialise before getting any opportunity to 'try their hand' at a variety of sports. It was also worried that unhealthy attitudes to competition were being fostered by 'the ugly parent syndrome'. Some parents do indeed set the wrong example and encourage poor sporting attitudes; others 'push' their children for selfish reasons rather than for the child's own enjoyment. The primary school setting was seen by the Committee as the best place to start countering the negative features of competitive sport.

The KiwiSport programme is managed by the *Hillary Commission for Recreation and Sport* which has a statutory responsibility to encourage the development of recreation and sport for the benefit of all New Zealanders. Seventeen national sports organisations and the Ministry for Education give their support to the KiwiSport programme.

KiwiSport was designed specifically for children aged 9 to 12. The Hillary Commission hoped to have 30 percent of all primary schools playing a KiwiSport within the first year. This goal was in fact achieved within the first two months. The first step for a school is to 'Register' for KiwiSport with the Hillary Commission, or for Aussie Sports with the Australian Sports Commission in Canberra. Then a resource kit of information is sent and arrangement made for training; a regular newsletter then arrives, with, for example, lists of equipment suppliers. In New Zealand after one year there was a registration rate of 70 percent. Now it is 90 percent of all primary schools. A 1989 evaluation report on the Aussie Sports Program, reported a 26 percent take-up approximately two and a half years after the programme was introduced. This lower take-up has little to do with the quality of the games, nor with differences between Australian and New Zealanders' attitudes to sport, but everything to do with the fact that there were fewer programme co-ordinators per child in Australia. Also, statistics do not highlight the existence of many unofficial Aussie Sports schools which are not formally registered but may be following the Aussie Sports programme, as also happens in New Zealand.

An evaluation

In July 1989, the Hillary Commission contracted an independent research team to conduct an evaluation of KiwiSport. The study included surveys of randomly-selected schools registered with the programme and schools not registered, as well as 10 individual case studies of schools using the programme. There were also surveys of the KiwiSport Regional Co-ordinators and the National Sporting Organisations' KiwiSport Representatives.

The School-based Surveys

In July 1989 New Zealand education was in the first throes of the major administrative changes called 'Tomorrow's Schools'. The research team was aware that both principals and teachers were experiencing considerable pressure as a result and expected this to lessen the chances of getting replies. The rate of response was, however, exceedingly high – 88 percent for the 177 registered schools and 90 percent for the 82 non-registered schools. While the survey was designed to get the best response possible, the popularity of KiwiSport, (even the non-registered schools were very interested and thinking of registering) undoubtedly contributed to the high response rate.

The schools' response to KiwiSport

Fewer than 2 percent of the schools registered with the programme had dropped out. Furthermore, those schools which had not registered were interested in becoming part of the programme, with about half planning to register in the immediate future. The three main reasons for using the programme were

(1) approval of the philosophy of KiwiSport;

(2) familiarity with modified games (the most commonly mentioned were **New Image Rugby, Kiwi Netball and Kiwi Cricket** – these are now played under the banner of KiwiSport;

(3) a response to KiwiSport promotional activities.

The main reason given for not registering was cost.

Who was using KiwiSport?

School children, aged 9- to 12-years-old (Standards 3 to Form 2 – Years 4 to 7), were the principal target group at the time of the evaluation. At Standard 3 and 4 levels (Years 4 and 5) virtually all teachers in registered schools were using KiwiSport. The number of teachers using KiwiSport with children younger than 9 was considerable: 34 percent with 5- and 6-year-olds, 58 percent with 7-year-olds, 86 percent with 8-year-olds. But in Special Classes (mainly for the intellectually handicapped) only 41 percent were using KiwiSport.

Forms 1 and 2 (Years 6 and 7) teachers said they used KiwiSport less because of

(1) children's lack of interest in KiwiSport;

(2) a need to develop their pupil's skills beyond that required for KiwiSport;

(3) problems that arose when trying to fit KiwiSport in with inter-school activities;

(4) the unsuitability of some KiwiSport equipment for this particular age group.

Which KiwiSports were being played in schools?

Seventeen KiwiSports were available to schools at that time. These included modified versions of hockey, cricket, rugby, rugby league, soccer, golf, athletics, badminton, basketball, tennis, table tennis, netball, softball, trampolining, orienteering, volleyball and squash. **Kiwi Cricket** was the most popular.

New Image Rugby, which ranked second as the most played KiwiSport in schools was also the most frequently dropped. Thirteen percent of the schools which initially took it up later stopped playing it. The reasons given by teachers for dropping **New Image Rugby** included

(1) children not enjoying playing it;

(2) the lack of inter-school competition;

(3) antagonistic attitudes to the game by local sports club coaches and parents.

The case studies also confirmed that an ambivalent relationship exists between traditional rugby and its **New Image** offspring. While teachers are aware of the game's advantages – it is faster, safer, easier to control, develops and improves handling skills, and is fun for both boys and girls – many parents, local sport club organisers and coaches tend to view **New Image Rugby** with some disdain. The modified version is seen as a poor substitute for 'the real game'. Some children, particularly the more physically able boys, tend to reflect these adult views. Yet, in those schools the research team visited it was apparent that the enthusiasm of teachers for the game can overcome negative outside influences. The excellent game described in the introduction, with its fit children and not-quite-so-fit referee suggests this to be so.

The third most commonly played KiwiSport was **Kiwi Netball**. This game suffers similar problems to those described of **New Image Rugby**; traditional female sports are subject to the same negative pressures applied to the established male sports.

Overall, the number of KiwiSports played in schools ranged from six to ten. Least popular were **Kiwi Trampoline** and **Mini Badminton** (only 4 percent were playing these sports). Cost was the main reason for not using Kiwi Trampoline while space was the principal reason for not playing Kiwi Badminton. Lack of expertise to teach a particular sport was the most frequently reported problem in a number of sports, particularly **Mini Footy** (a modified version of rugby league), **Kiwi Golf**, **Orienteering**, and **Squash**.

The work of the KiwiSport Regional Co-ordinator in schools

The role of the KiwiSport Regional Co-ordinators is to promote the programme and to provide training for teachers. Employed by the Hillary Commission, the Co-ordinators have promoted KiwiSport through a series of festivals, demonstration and in-service training days. Generally speaking, the Co-ordinators' work in schools was valued, and their credibility appeared to be high, with schools wanting more of their attention, not less. Of all the schools using the programme, two-thirds reported having had some contact with the Regional Co-ordinators. The majority of teachers (45 percent) were satisfied with the contact they had had, although 30 percent were neither satisfied nor dissatisfied. Very few were very dissatisfied.

Expectations of the Co-ordinators

Teachers expected the Regional Co-ordinators to provide schools with information about KiwiSport as their main task. This meant demonstrating the KiwiSport equipment, providing information about its costs, where to get hold of equipment, ways in which it might be modified to cope with skill progression, and generally giving teachers moral support to set-up and maintain their KiwiSport programmes.

The second most frequently mentioned expectation was for the Co-ordinators to provide teachers with KiwiSport training. In fact 73 percent of teachers had received some form of training; 21 percent had not. The majority of teachers (65 percent) were satisfied or very satisfied with the KiwiSport training they had received. Only 10 percent were dissatisfied or very dissatisfied, but there was a strong call for more training. Most suggestions for improving training were in fact not about the quality of training but asked that the training be more accessible – that there be more of it.

The use of specialised KiwiSport coaching manuals and videos

Specialised training manuals and videos have been developed, not by the Hillary Commission but by some of the 17 national sporting organisations involved in Kiwi Sport. The penetration of these coaching aids into schools, however, was not high. The greatest number of manuals and videos are owned by those schools playing **New Image Rugby**– a quarter of the schools have them. **Kiwi Cricket** and **Kiwi Netball** coaching manuals and videos were also found in a reasonable proportion of schools. The next highest was **Kiwi Orienteering**.

The main strengths of the Kiwisport programme

Teachers were asked to state the three main strengths of KiwiSport. In all, 123 teachers made comments (see the bracketed figures). The three most frequently mentioned concepts were:

- KiwiSport increases children's participation or involvement in physical activity (52)
- It provides a variety of sports, introduces new sports, gives a grounding for other sports while offering time to try out various sports before attempting specialisation (52)
- The programme is based on skill development and improves the variety or range of skills (40).

During the case-studies the children made a lot of positive comments about KiwiSport. The most common were, 'It was great fun', 'Fun', 'Exciting', 'I like it because it's fun – because all of the teams enjoy it and, you know, they're all cheering and enjoying themselves and everything.' One child at a country school provided an answer that sums it up:

> I like any kind of sport... KiwiSport gives you the skills so you can play the proper game better.

The main problems with the KiwiSport programme

Teachers were asked to describe the three main problems with the KiwiSport programme (117 teachers responded to this question). The three most frequently mentioned categories were:

- Equipment-related: cost and access to equipment, problems with equipment storage, maintenance and modifying existing equipment (71)
- Lack of training, information, confidence and expertise among teachers about KiwiSport (32)
- Limited time available to teachers, a bad year ('Tomorrows Schools') (22).

The cost of KiwiSport equipment was seen by teachers as a major reason why they did not play particular KiwiSports. But when this factor was considered in relation to the size of school, it did not appear to have stopped smaller schools from participating in the programme. Equipment unavailability was also a deterrent and there were several calls for a list of suppliers to be sent to schools. Arrangements to rectify this problem have been negotiated between the Hillary Commission, the various sports, and a major sports equipment distributing company. The Commission hopes this will solve the problem.

There were minor grouches from the children about the gear ('The wickets blow over', 'The ball hurts your hands') and some which were actually the result of poor teaching ('I hate the talks; I'd rather get into it', '**Kiwi Orienteering** is just hunting pieces of paper'). The rules irked some of the better players ('In **Kiwi Netball** we don't really like swapping positions all the time', 'In real rugby you can just pass the ball even if they touch you; I have to keep stopping all the time in **New Image**'). However, most of the remarks from the children were enthusiastic.

Conclusion

The low number of schools that had stopped using KiwiSport altogether, and the very few instances where one particular sport had been discontinued, were taken as positive signs that initial zeal for KiwiSport had not been stifled, despite teething problems. The overwhelming impression from the surveys was one of enthusiasm. Both users and providers agree that it is a worthwhile and beneficial modified sports education programme. It is generally seen to have increased children's participation and to have encouraged their skill development in a variety of sports. Teachers, once trained, find the programme easy to teach and, most importantly, children like it.

Notes

The authors of this item were all members of the research group, *Social Research Services* and can be contacted c/o 130 Old Porirua Rd, Ngaio, Wellington 4, New Zealand.

For further reading on the sampling, methodology and findings of the KiwiSport evaluation see:

McClellan, V. ,Leibrich, J., Bradshaw, J. and Neale, J. (1989) *An Evaluation of KiwiSport – A Hillary Commission Programme*, Wellington: Hillary Commission for Recreation and Sport.

In order to register in the KiwiSport Programme a school needs to purchase a KiwiSport Resource Kit which contains a 'how to do it' manual and other activity-based and promotional accessories. The address for the *Hillary Commission for Recreation and Sport* is P.O. Box 2251, Wellington, New Zealand.

In order to register in the Aussie Sports Program a school needs to write to the *Australian Sports Commission*, P.O.Box 176, Belconnen, Canberra ACT, 2616, Australia.

The information concerning the Evaluation of Aussie Sports was taken from:

Clough, J. and Traill, R. (1989) *The 1988 Evaluation of Aussie Sports*, Canberra: The Australian Sports Commission.

Information concerning the role of education and sport was taken from

The Report of the Sports Development Inquiry Committee, (1985) Sport on the Move, Wellington.

The review of the New Zealand physical education syllabus can be found in

Department of Education, (1987) *Physical Education Syllabus for Junior Classes to Form 7 with Guidelines for Early Childhood Education*, Wellington: Department of Education.

Following the results of the research outlined in this item the Hillary Commission has placed special emphasis on resourcing 'delivery systems' to meet the expansion of KiwiSports, now found in 90 percent of all New Zealand primary schools. Special attention has been placed on teacher training.

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item 3

IQ Tests and Cultural Distance

set research information for teachers
number two 1990

James Flynn
Otago University

with comments by

John Raven
Edinburgh

... but of course, I got a VERY high score on the IQ test I did...
... cultural distance probably accounts for THAT..
What does THAT mean ?
You mean, YOU don't KNOW ?
Shona McLean

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IQ Tests and Cultural Distance

James Flynn
Otago University

I AM GOING TO STRESS the limitations of IQ tests but it would be wrong to think that critics like myself discount these tests entirely. For example, I am going to argue that teachers sometimes have too much faith in 'IQ thresholds', the notion that someone with an IQ of 110 has only a 50-50 chance of graduating from university, or that someone with an IQ below 125 cannot hope to be a doctor or engineer. But still, I would not deny that someone with a high IQ, who fails first year at university, is probably performing below his or her ability.

And it would also be wrong to think that scholars like Jensen, who uses IQ tests to develop a theory of intelligence, has some sort of blind faith in IQ tests. In fact, Jensen tells teachers to discard group-administered mental tests in favour of achievement tests, given after a unit of instruction, that tell the teacher exactly what the pupil has or had not learned. He goes so far as to say '... it is hard to see why a teacher should need to know a pupil's IQ' and 'I've never bothered to find out my own IQ because I don't know what I could do with it if I knew.' And adds, sensibly enough, that the only way to find out if you can achieve something is to *try* to achieve it.

Having stressed the reservations about IQ tests most scholars share, I will now focus on limitations that are sometimes overlooked, namely, the limitations *cultural distance* places on IQ tests. I believe that this generation lives in a different cultural climate than the last, and that ethnic groups like white Americans and Chinese Americans have very different cultural traditions. Both kinds of cultural distance have practical implications, but first I want to say something about theory, about whether IQ tests measure something that deserves to be called intelligence.

IQ and the Generations

Until recently the Spearman-Jensen theory had a strong claim to be the most successful theory of intelligence. It identifies intelligence with IQ and there is no doubt that in many contexts IQ does behave in accord with our intuitions about intelligence. For example, it shows intelligence increasing with age up to maturity and it correlates pretty well with teacher ranking of children for ability and subsequent academic achievement. It establishes IQ thresholds for various occupations and these rank occupations in accord with how most people rank them when they think of their cognitive demands and social prestige. People who strike us as mentally retarded generally get low IQs and those who seem to have quick or profound minds generally get high IQs. IQ also has a claim to play some of the causal roles we would ascribe to intelligence, for example, if two male siblings are differentiated by IQ, the one with the higher IQ tends to rise in occupational status while the lower one tends to fall.

However, the Spearman-Jensen theory goes beyond these contexts to claim that IQ tests, primarily nonverbal tests like Raven's Progressive Matrices, can measure the intelligence of nations, and races, and ethnic groups despite the cultural distance that separates them. Some of these claims are now suspect thanks to a new development, namely, the phenomenon of massive IQ gains over time. This shows that IQ tests cannot bridge the cultural distance that separates one generation from another and means that we must re-assess whether they can bridge other kinds of cultural distance.

Young adults in 1980 outscored the young adults of 1950 by about 18 IQ points on Raven's, 15 points on Wechsler-Binet tests, and 11 points on purely verbal tests. These trends hold for every nation for which we have data, fourteen nations originally but now Denmark, Sweden, Brazil, Israel, Scotland, and perhaps China have joined the list to make a total of twenty. The best data come from the Netherlands and show a 20-point gain on Raven's. Since there has been no evidence that those with creative genius have multiplied by sixty times, no reports by teachers that gifted students fill their classrooms, and a decrease rather than an increase in the number of inventions patented, these IQ gains cannot be identified with gains in intelligence. If we took the Dutch gains seriously, we would be forced to conclude that the *average* Dutchman of today is at the 90th percentile of intelligence for his father's generation. Apparently the cultural distance the Netherlands travels in thirty years, or even ten years, is enough to negate the correlation between IQ and intelligence.

Thus every attempt to explain the cause of massive IQ gains has failed. Massive IQ gains have not been caused by altered administration or scoring of tests, examiner laxity or skills, test sophistication, a growing body of learned items, increased years of schooling, enhanced academic achievement, the new maths, TV or Sesame Street-type TV programmes, socioeconomic status gains, urbanization, fluctuation in family size, selective mating, increased outbreeding, the rigors of the great depression or World War Two. Some causal hypotheses that have been suggested are so general they are difficult to falsify. For example, the suggestion that democratic parents and open educators have been encouraging children to learn the kind of problem-solving skills required by IQ tests. Even if true, this hypothesis would leave the most important problem unsolved: why do these skills not translate into real-world intelligent behaviour? It would also force 'open educators' to confront this question: what profit is there in producing massive problem-solving gains if these pay so few dividends in creativity, inventions, vocabulary, and do not result even in enhanced academic achievement? The present situation is truly baffling. It is as if we suddenly discovered a dramatic escalation of juggling skills and yet, there was no carry-over to socially significant sport – no one seemed to have better timing or co-ordination when playing football or basketball or cricket.

A few years ago, Jensen claimed that we could compare the intelligence of chickens, with that of dogs, with that of primates, with that of humans, with that of extra-terrestrials. He envisaged a chain of tests running from the detour problem, through oddity problems, through Raven's Matrices, to presumably a form of Raven's adopted to extra-terrestrials, which would measure intelligence not only between all human groups but also between species. Today we know that Raven's Matrices cannot compare the Dutch of 1982 with the Dutch of 1972 for intelligence. Until we know what went wrong, comparing the English with the Portugese, Kalahari Bushmen with Polar Eskimos, Martians with chickens, will have to wait.

Practical Implications

Massive IQ gains create obsolete norms and obsolete norms encourage inflated IQ estimates. For example, even so great a scholar as Vernon in 1982 believed that Chinese Americans had a mean IQ of 110 on nonverbal tests and therefore, were well above the white average set at 100. He was misled by studies that used tests with obsolete norms, that is, tests normed against whites from twenty to thirty years before. Naturally, Chinese Americans outscore the whites of thirty years ago but they cannot outscore the average white of today. Similarly, in New Zealand, prisoners were once thought to have above average IQs but this turned out to be because they were scored against obsolete norms. Score gains on *achievement* tests have been much lower than score gains on IQ tests, even nonexistent. But in America, score gains over time have been significant on most tests at the primary school level. School officials from systems clearly below average have been known to score their pupils against out-of-date tests and offer parents the false reassurance that their children are performing above national norms. In America, the ludicrous situation has developed where every one of the fifty states is 'above average' on the six major commercially available achievement tests!

When people take two IQ tests, they usually score higher on the older test simply because its norms are more obsolete and set a standard of performance easier to beat. Therefore, the higher scores do not really signify a better performance. Researchers, unaware of this, are often pleased when disadvantaged groups score better than usual on obsolete tests, for example, black or lower-class children. Therefore, they are tempted to hail obsolete tests as more suitable for such children in terms of content, administration, standardization, establishing rapport, and so forth. They also want such children to be helped. When first results from the famous Milwaukee Project showed ghetto black children, who had participated in the Project's enrichment programme, with a mean IQ of over 120, the usual reaction was to take the scores at face value. In fact, the IQs were grossly inflated because their subjects were being scored against norms that suffered from forty years of obsolescence.

IQ gains over time have falsified the assumptions used to justify the use of IQ tests to classify people as mentally retarded. These were: a certain IQ isolates a certain percentage of the population at the bottom of the IQ curve; it is sensible to classify *that* percentage as mentally retarded, that is, psychologists can determine that *that* group is dysfunctional either at school or in ordinary life. In the late 1940s, those below an IQ of 70 were classified as mentally retarded because an IQ of 70 was thought to isolate the bottom 2.27 percent of white Americans. When the Wechsler Intelligence Scale for Children (WISC) was normed in 1947-1948, a WISC IQ of 70 may have isolated the bottom 2.27 percent of white Americans. But by the early 1970s, white Americans had gained over 8 IQ points which meant that almost all of them, on the old test, were now scoring above 70. The percentage below 70 had dropped to about 0.54%. Taking all races, the number of Americans eligible to be classified as mentally retarded had dropped from 8.8 million to only 2.6 million. The fact that this went unnoticed by psychologists proves that they had no real criterion of how many Americans were truly dysfunctional. In 1974, the Weschler Intelligence Scale for Children Revised (WISC-R) was published and the new test, of course, dramatically increased the number eligible to be classified as mentally retarded overnight. The record is clear: over the last forty years, psychologists have used many radically different criteria for mental retardation and have no reason to favour one over another.

Massive IQ gains have reopened the question of how intelligence interacts with age. The orthodox view was that intelligence (in the sense of mental agility) peaked by the early 20s, then began a gradual decline which accelerated in old age. However, much of the evidence for this hypothesis was from cross-sectional data which compare, for example, 65-year-old and 20-year-old subjects with both groups tested at the same time. We now know this comparison is invalid. Even if today's 65-year-olds have lost *no* ground since they were 20, they would be outscored by today's 20-year-olds; after all, the latter have profited from forty-five years of massive IQ gains, which could mean as much as 30 points on tests like Raven's. Raven and Court have reanalyzed British data and concluded that performance on Raven's has not declined between the ages of 20 and 65. Perhaps those involved in adult education need not anticipate reduced mental agility in their students.

Finally, to return to the American scene, the generational data present educators with a new and very puzzling problem: how can we explain the fact that young Americans made massive IQ gains throughout the very same years during which they registered significant losses on the famous Scholastic Aptitude Test (SAT)? Most universities use the SAT to choose their entering students.

IQ and Ethnic Groups

Chinese and Japanese Americans are often cited as proof that IQ tests can explain why certain ethnic groups outachieve others. When asked why Asian Americans outperform white Americans in academic achievement, admission to elite universities, and attaining high status occupations, Jensen replied that IQ tests showed that they were smarter. But what if Chinese and Japanese Americans do not have higher IQs than whites? Then we would have to look towards non-IQ factors.

I have reanalyzed the published literature on Asian American IQ and achievements since 1938. The Coleman Report of 1965 is unique in measuring a representative nationwide sample of Chinese and Japanese Americans against a similar sample of whites. With the white mean set at 100 and standard deviation at 15, Chinese and Japanese 17- and 18-year-olds scored 100 for nonverbal IQ, 97 for verbal IQ, and 98.5 overall. Only nine other studies have any claim to reliability. Three allow us to score Chinese or Japanese against their white peers and give values close to those of the Coleman Report. The rest either compared Chinese or Japanese to substandard white samples or scored them against test norms anywhere from 10 to 33 years obsolete. When these studies are adjusted, they too confirm the Coleman Report.

The high IQs of Chinese and Japanese Americans are an illusion but their outstanding achievement are *not* an illusion. By 1980, Chinese Americans who were 17 or 18

in 1965-1966 were 31 to 33 years of age and the census shows that 55 percent of them were in managerial, professional, or technical occupations. The figure for whites was only 34 percent. We know the IQ thresholds whites normally need to attain to enter these occupations. If we used these to *estimate* the average IQ of these Chinese from their occupations, we would have to suggest their average IQ was 120. So now we have a huge IQ/achievement gap: 120 (estimated IQ) minus 99 (actual IQ) equals 21 points. The Japanese American gap is lower at 10 IQ points. It might be thought that this is because a higher percentage of Japanese Americans are born in the USA and therefore retain fewer cultural differences. But interestingly, Japanese Americans born in the USA have the same IQ/achievement gap as those who came to America with their parents from Japan. And Chinese Americans born in the USA have the same gap as those who came from Hong Kong or Taiwan.

To explain Chinese and Japanese overachievement vis à vis whites, we must construct hypotheses out of ethnic differences and two hypotheses best fit the data. First, Chinese Americans can be 7 IQ points below whites and yet still achieve the mix of high school grades and SAT scores that will get them into a university. And similarly those Chinese Americans can also match higher IQ whites on those tests that determine entry into graduate schools and professional schools such as medicine, law, and business. The IQ threshold for whites for entry into high status occupations (circa 1980) was 97; for Chinese it was about 90. Thus the Chinese Americans had a larger pool of potential achievers. Second, about 80 percent of Chinese with IQs above 90 actually entered managerial, professional, or technical posts. Only 60 percent of whites with IQs above 97 did. Chinese Americans simply capitalize on their pool of potential achievers more effectively than white Americans capitalize on their own pool. Collectively these two hypotheses, lower IQ threshold and higher capitalization rate, explain why Chinese Americans so outnumber whites in high status occupations. The Japanese advantage can be explained by an IQ threshold 3 points below white, and a capitalization rate of 76 percent.

Practical Implications

There is no doubt IQ thresholds exist for various universities, professional schools, and occupations, that is, those below a certain IQ have little chance of gaining entry. However, our ethnic data urge caution about advice and policies based on IQ thresholds. For example, Chinese thresholds are about 7 points lower than white thresholds. It might seem appropriate to counsel individuals on the basis of their group membership but I think that dangerous. How do you know when you are confronted with a Chinese student with a character structure more typical of whites, or a white with a character structure more typical of Chinese? The safest course appears to be to choose the lowest IQ threshold existent and not give negative advice to anyone at that level or above.

To make sure no-one who could succeed is excluded, no-one from the top 75 percent of the total white population should be discouraged from aspiring to some high status occupation such as technician or shop manager or nurse, at least not on the basis of IQ alone. No-one from the top 50 percent should be prevented from aspiring to some elite profession such as physician or natural scientist. In practical terms this means that those who can hope for a particular occupation should not be discouraged from seeking the relevant academic credentials. A word of warning: merely because we should not use *IQ* to discourage aspirants does not mean we can ignore proven academic deficiencies. Low achievement test scores, poor grades over a normal high school curriculum, are quite another matter.

Note that when calculating who is in the top 50 or 75 percent, we must use current white norms. Most IQ tests in actual use have all-races norms and suffer from obsolescence and therefore, our values for IQ thresholds must be translated into the equivalent scores on each test. For example, take the WISC-R: 89.5 on a whites-only scale translates into 92.5 on its all-races scale; eighteen years of obsolescence adds another 5.5 points, which gives 98.0. So the minimum WISC-R thresholds for high status occupations and elite professions would be about 98 and 108 respectively.

IQ and Achievement

It may be objected that the example of Chinese and Japanese Americans' achievement has little applicability to other groups. For example, blacks have an average IQ of 85. Perhaps there is a critical level below which non-IQ factors cannot compensate for lower IQ. The achievements of Filipino Americans call this objection into question. Three studies put the average IQ of Filipinos resident in America prior to 1970, between 85 and 90. And yet, this group has surpassed whites for occupational status, have 94 percent of white income, and have fewer families below the poverty level.

Does IQ mismeasure the potential achievements of ethnic groups only? Not at all. Here is a case that serves as a bridge between ethnicity and gender. Women tend to be under-represented in mathematics and science and Jensen hypothesizes that this is because they do worse on tests of spatial visualization. The mathematical achievements of Jewish Americans falsify this hypothesis. When normed on non-Jewish whites of the same sex, Jewish subjects turn a 10-point deficit for visuo-spatial IQ into a 10-point advantage on mathematics tests. As for occupation, they outnumber non-Jewish whites as mathematicians and statisticians by over three to one. Clearly something more complex than IQ is needed to explain female under-representation in mathematics and science.

Mean IQ also mismeasures the potential achievements of nations. China and Japan may have a 1- to 5-point IQ advantage over white America. Lynn believes the Japanese advantage has played a significant role in that country's economic miracle because it 'takes brains to drive Western industrialists out of their own markets'. Basiuk sounds a note of despair: Japan's human material is simply much better than that available in America. Rushton includes the Chinese: 'the Oriental population of the Pacific Rim must be expected to... outdistance the predominantly Caucasian population of North America and Western Europe'. This kind of concern is misdirected. Rather than worrying about whether Japan or China has an IQ advantage, we should be worrying about the non-IQ advantage American-born Japanese and Chinese enjoy over whites. These ethnic differences have a potency at least four times as great as any IQ advantage Japan or China may have! This massive advantage exists even when cultural differences are blurred within the United States by shared language, schooling, and media content. Therefore, how great may be the differences cultural factors produce when people are still in their own countries and the differences are at full strength?

The message of recent research can be put in a few words: IQ tests have not yet learned how to bridge certain kinds of cultural distance; and culture *is* important. We must go beyond IQ if we want a real understanding of group over-achievement and group under-achievement.

Comment on IQ Tests and Cultural Distance

John Raven
Edinburgh

Dr John Raven, whose manual on the Raven's Progressive Matrices (the major non-verbal IQ test) is mentioned above, was asked to comment on Professor Flynn's item. He did so as follows:

Professor Flynn's article is basically correct.

(a) Educators have over-claimed the benefits of education – educational credentials have NO validity outside the educational system. To be more precise, the *number of years* you have been educated predict your 'success' in life, but the *quality* of the educational awards (which we spend so much time trying to enhance and assess), at any terminal level, does not.

(b) Psychologists have over-claimed about IQ – it accounts for only about 10% of the variance in performance outside the educational system.

(c) Psychologists and educators have utterly failed to address the kind of motivational variables the importance of which Flynn has highlighted. It is vital to find ways of getting a better fix on the motivational variables which contribute so much to differences in performance.

(d) Professor Flynn does fail to note that many other abilities and physical attributes have increased dramatically – Japanese are getting taller, as Europeans have since Elizabethan times, and there is a continuous increase in the breaking of athletic records. Height increases are important because they overturn the argument that measures which increase over time and yield sex and ethnic differences (as IQ measures do) are invalid.

The improvement in athletic records specifically contradicts Professor Flynn's claim in the main article. Also other intellectual changes have taken place; for example, the number of books published has increased and the complexity of ideas that people have to deal with routinely at work has increased over time. It is not clear why the number of patents filed has not increased but the explanation could be the same as why there are no more Olympic gold medalists than 20 years ago despite the fact that the performances required to gain them have increased dramatically – that is, one criterion may in effect be norm referenced while the other is criterion referenced.

(e) The fact that height has increased dramatically over time despite sex and ethnic differences in no way invalidates rulers as measures of height.

(f) Not ALL abilities have been going up, for example vocabulary test scores are static. This is also true for other 'reproductive' measures, that is those concerned with reproducing facts. It is 'eductive' abilities that have been increasing fastest. These are the abilities to 'squeeze meaning out of', to form creative new insights, to go beyond the given, to see meaning in confusion, to form high level (largely non-verbal) constructs which make it easy to handle complex information. Now isn't it interesting that such abilities should be increasing most when it is precisely these abilities on which modern society is most dependent!

This helps demonstrate the importance of measuring separately these two, theoretically separable, components of what Spearman called 'g'. He saw 'g' as being made up of two quite different types of ability – 'repro-ductive' and 'e-ductive' – which were very different but worked closely together. What Professor Flynn (in line with my work) has done is vindicate that point of view: we have shown that these two abilities do have different genetic and environmental pedigrees; they have different causes; and they have different consequences.

(g) The differences over time and the ethnic/cultural differences help elucidate the very research questions the tests were developed to try to elucidate. What emerges is that the most plausible explanation of the increases in IQ over time and the ethnic/cultural differences is that they are due to the same variables as the similar changes in height, birth weight and infant mortality, that is, to nutrition, welfare and hygiene.

Raven's Progressive Matrices were designed for use in a study of the genetic and environmental determinants of mental abilities and defects. What Professor Flynn has shown is a previously unsuspected effect of the ENVIRONMENT. And what the data as a whole show is that the relevant features of the environment are NOT educational: one of the notable things associated with this dramatic increase over time is that there is a remarkable cross-cultural stability in the norms obtained from societies with a literary tradition at any point in time, for example in China, Australia, New Zealand, East and West Germany, Czechoslovakia.

(h) Professor Flynn initially argued that these damn fool tests were useless for making cross-cultural comparisons. What he is now, *de facto*, doing is *using* these tests to show that *as far as these abilities are concerned*, there are *no* differences... a finding which he now considers to be very important! He therefore seeks the explanation of the gross visible difference elsewhere.

Professor Flynn's work is basically sound; his cautions are extremely important; and the void in understanding the components of competence rightly criminalises psychologists and educators. But his work validates, rather than calls in question, the basic theoretical principles which guided the development of the tests and helps to answer the very questions they were developed to try to answer.

Notes

Dr James Flynn is Professor of Political Science at the University of Otago, Box 56, Dunedin, New Zealand. He has published extensively on problems with IQ as a measure of difference between races and groups. Some of his papers are mentioned later, others include debate with Jensen, Lynn and Rushton on the suggestion that some races are less intelligent than others, for example,

Flynn, J.R. (1980) *Race, IQ and Jensen*. London: Routledge.

Flynn, J.R. (1988) Japanese intelligence simply fades away. *The Psychologist*, Vol. 1, pp. 348-350.

Flynn, J.R. (1989) Rushton, evolution and race. *The Psychologist*, Vol. 2, pp. 363-366.

Jensen's views on the use and abuse of IQ tests and on the Spearman-Jensen theory of intelligence can be found in

Jensen, A.R. (1981) *Straight Talk about Mental Tests*. New York: The Free Press.

Jensen, A.R. (1980) *Bias in Mental Testing* (Chapters 4 and 6). London: Methuen. See pages 175-182 and 247-248 for Jensen on measuring the intelligence of animals, humans, and extra-terrestrials.

That young adults in 1980 outscored young adults of 1950, and the consequences from the international figures on gains, can be found in

Flynn, J.R. (1987) 'Massive IQ gains in 14 nations: What IQ tests really measure'. *Psychological Bulletin*, Vol. 101, pp. 171-191.

Causal hypotheses on why there are such huge IQ gains over time can be found in

Raven, J. and Court, J.H. (1989) *Manual for Raven's Progressive Matrices and Vocabulary Scales. Research Supplement No. 4*. London: Lewis.

The facts and conclusions about IQ changes over time and classification of people as mentally retarded can be found more fully detailed in

Flynn, J.R. (1985) 'Wechsler intelligence tests: Do we really have a criterion of mental retardation?'. *American Journal of Mental Deficiency*, Vol. 90, pp. 236-244.

Comparisons of the WISC-R and the Wechsler Adult Intelligence Scale Revised (WAIS-R) reveal that the latter is 7.5 IQ points more lenient at the level of mental retardation (Spitz, 1989). Since these two tests were normed at about the same time, this gross discrepancy cannot be due to IQ gains over time but probably reveals sampling error (Flynn's comment).

Spitz, H.H. (1989) 'Variations in Wechsler interscale IQ disparities at different levels of IQ'. *Intelligence*, Vol. 13, pp. 157-167.

The orthodox view that intelligence peaks in our 20s can be found in Jensen (1980) mentioned above.

The re-analysis of British data by Raven and Court can be found in their manual mentioned above.

The puzzling problem of IQ gains and SAT losses is discussed in

Flynn, J.R. (1984) 'The mean IQ of Americans: Massive gains 1932 to 1978'. *Psychological Bulletin*, Vol. 95, pp. 29-51.

and

Flynn, J.R. (1987) 'Massive IQ gains in 14 nations: What IQ test really measure' 5. *Psychological Bulletin*, Vol. 101, pp. 171-191.

The author's re-analysis of literature on Asian American IQ and achievement since 1938 is in

Flynn, J.,R. (1989) *Asian Americans: IQ, Genes, and Achievement*. Unpublished manuscript.

The Coleman Report is

Coleman, J.S. et al. (1966) *Equality of Educational Opportunity*. Washington DC: US Office of Education.

and

Coleman, J.S. et al. (1966) *Equality of Educational Opportunity, Supplemental Appendix, Section 9, 10, Correlation Tables*. Washington DC: US Office of Education.

The analysis of Filipino Americans' and Jewish Americans' IQ and achievement is in an unpublished paper available from the author.

Flynn, J.R. (1989) *Asian Americans: IQ, Genes, and Achievement*. Unpublished manuscript.

The papers attributing Japanese and Chinese success to greater intelligence are

Lynn, R. (1987) 'Japan: Land of the rising IQ. A reply to Flynn'. *Bulletin of the British Psychological Society*, Vol. 40, pp. 461-468.

and

Basiuk, V. (1984) 'Security recedes'. *Foreign Policy*, Vol. 53, pp. 49-73.

and

Rushton, J.P. (1989) *Evolutionary biology and heritable traits: with reference to Oriental-white-black differences*. Paper presented at the Annual Meeting of the American Association for the Advancement of Science, San Francisco, USA.

Vernon's belief in the higher IQ of Chinese Americans can be found in

Vernon, P.E. (1982) *The Abilities and Achievements of Orientals in North America*. New York: Academic Press.

That New Zealand prisoners were once thought to be more intelligent can be found explained in

Burgon, J.R. (1987) *Report on the use of the Standard Progressive Matrices with male corrective trainees*. Unpublished report, Wellington: New Zealand Council for Educational Research.

There has been a great deal of discussion of the results which show every state of the USA 'above average' for academic achievement. An excellent discussion of how this came about is in

Connell, J.J. (1988) *Nationally normed elementary achievement testing in America's public schools: How all fifty states are above the national average*. Unpublished paper, Friends for Education, available from J.R. Flynn, University of Otago, Dunedin, New Zealand.

The reaction to the Milwaukee Project is exemplified by that in

Clarke, A.D. (1973) 'The prevention of subcultural subnormality: Problems and prospects'. *British Journal of Mental Subnormality*, Vol. 19, pp. 7-20.

and

Mussen, P.H., Conger, J.J., and Kagan, J. (1974) *Child Development and Personality*, 4th ed. New York: Harper and Row.

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set research information for teachers
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SCHOOL CLIMATE

Assessing and Improving School Environments

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Together with curriculum, resources, and leadership, school environment (or climate) makes a major contribution to the effectiveness of a school. The environment is a set of factors which 'gives each school a personality, a spirit, a culture'. Therefore, attention to school environment can contribute to school improvement.

However, there are few 'paper and pencil' ways of checking your own school and few case studies of teachers' successful attempts to improve school environments. This *set* item, and the next, help fill those gaps. In Australia a paper and pencil 'instrument' has been developed, tried, and refined. This item has some of the theory and an interesting case study. The next item is the 'instrument' itself, the *School Level Environment Questionnaire (SLEQ)*. You may copy it and use it. The authors will be most interested in any results and comments that arise from its use.

Theory

The Assessment of School Environment

School environment instruments have been developed before, and go back to at least 1958. However most of them are awkward to use and do not have a clear basic theory. Moos in the early 1970s worked in a variety of environments including hospital wards, school classrooms, prisons, military companies, university residences and 'ordinary' workplaces. He found three diverse psychosocial dimensions in these environments.

(1) *Relationship Dimensions* (e.g., peer support) which identify the nature and intensity of personal relationships and assess the extent to which people are involved, and support and help each other.

(2) *Personal Development Dimensions* (e.g., professional interest) which assess the basic directions along which personal growth and self-enhancement tend to occur.

(3) *System Maintenance and System Change Dimensions* (e.g., innovation) which is the extent to which the environment is orderly, clear in expectations, maintains control and is responsive to change.

Moos developed a questionnaire about work environments and we found that it could be easily adapted for schools.

Development of the SLEQ

We realised that a new environment questionnaire would need dimensions to characterise important aspects in the school environment, such as relationships among teachers and between teachers and students and the organisational structure; it would also need dimensions to cover Moos's three general categories – Relationship; Personal Development; System Maintenance and System Change.

To make sure that the new instrument was valid we needed extensive interviews with teachers to ensure that dimensions and individual items covered what teachers saw as salient, and that only material which was specifically relevant to the school was included. In developing the SLEQ, an attempt was made to achieve economy by having a relatively small number of reliable scales, each containing a fairly small number of items.

With these criteria in mind a seven-scale instrument was developed. Two scales measure the Relationship Dimensions (Student Support, Affiliation), one measures the Personal Development Dimension (Professional Interest) and four measure System Maintenance and System Change Dimensions (Staff Freedom, Participatory Decision Making, Innovation, and Resource Adequacy). To complete the view of the school environment, a scale named Work Pressure has been added recently, making an eighth.

Table 1 shows the nature of the SLEQ and provides information about the method and direction of scoring.

An interesting feature of the SLEQ is that it has two questionnaires. One asks about the way things are at present (*Actual* Form), the other asks how you would prefer things to be (*Preferred* Form). Items in the two forms are worded almost identically. An item such as 'Teachers are encouraged to be innovative in this school' in the *Actual* Form is changed to 'Teachers *would be* encouraged to be innovative in the school' in the *Preferred* Form.

Validity of the SLEQ

Validity data are available for the SLEQ for three samples and these are given in Table 2. An analysis shows that each scale shows satisfactory internal consistency reliability, there is satisfactory scale independence and the SLEQ measures distinct aspects of school environment. The details of this analysis are in the notes section at the end of this item.

Improving School Environments

The method we have successfully tried is based on techniques used with success in the past for improving classroom-level environments and for improving psychiatric hospital wards, family therapy groups, law enforcement agencies and alcoholism treatment programmes.

Table 1:
Description of Scales in the SLEQ and their Classification According to Moos's Scheme

Scale Name	Description of Scale	Sample Item	Moos's General Category
Student Support	There is good rapport between teachers and students and students behave in a responsible self-disciplined manner.	There are many disruptive, difficult students in the school. (-)	Relationship
Affiliation	Teachers can obtain assistance, advice and encouragement and are made to feel accepted by colleagues.	I feel that I could rely on my colleagues for assistance if I should need it. (+)	
Professional Interest	Teachers discuss professional matters, show interest in their work and seek further professional development.	Teachers frequently discuss teaching methods and strategies with each other. (+)	Personal Development or Goal Orientation
Staff Freedom	Teachers are free of set rules, guidelines and procedures, and of supervision to ensure rule compliance.	I am often supervised to ensure that I follow directions correctly. (-)	System Maintenance and System Change
Participatory Decision Making	Teachers have the opportunity to participate in decision making.	Teachers are frequently asked to participate in decisions concerning administrative policies and procedures. (+)	
Innovation	The school is in favour of planned change and experimentation, and fosters individualisation.	Teachers are encouraged to be innovative in this school. (+)	
Resource Adequacy	Support personnel, facilities, finance, equipment and resources are suitable and adequate	The supply of equipment and resources is inadequate. (-)	
Work Pressure	The extent to which work pressure dominates the school environment.	Teachers have to work long hours to keep up with the workload. (+)	

Items designated (+) are scored by allocating 5, 4, 3, 2, 1, respectively, for the responses Strongly Agree, Agree, Not Sure, Disagree, Strongly Disagree. Items designed (-) are scored in the reverse manner. Omitted or invalid responses are given a score of 3.

Table 2:
Reliability (Alpha Coefficient) and Scale Independence (Mean Correlation of Scale with other Scales) for each SLEQ Scale for Three Samples

Scale	Number of Items	Form	Alpha Reliability			Mean Correlation with Other Scales		
			Sample 1	Sample 2	Sample 3	Sample 1	Sample 2	Sample 3
Student Support	7	*Actual*	0.70	0.79	0.85	0.19	0.19	0.10
		Pref			0.81			0.31
Affiliation	7	*Actual*	0.87	0.85	0.84	0.34	0.18	0.38
		Pref			0.77			0.42
Professional Interest	7	*Actual*	0.86	0.81	0.81	0.29	0.29	0.36
		Pref			0.77			0.43
Staff Freedom	7	*Actual*	0.73	0.68	0.64	0.31	0.05	0.30
		Pref			0.76			0.30
Participatory Decision Making	7	*Actual*	0.80	0.69	0.82	0.34	0.22	0.34
		Pref			0.74			0.28
Innovation	7	*Actual*	0.84	0.78	0.81	0.38	0.22	0.42
		Pref			0.77			0.31
Resource Adequacy	7	*Actual*	0.81	0.80	0.65	0.22	0.19	0.35
		Pref			0.64			0.44
Sample Size			83	34	109	83	34	109
			19	34	10	19	34	10

Note: No validity data for the new Work Pressure Scale are yet available.

This involves the following fundamental steps:

1. *Assessment*. Teachers answer the questionnaire, both the *Actual* and the *Preferred* Forms.
2. *Feedback*. The answers are scored and the results summarised as profiles of mean school scores. These profiles are a useful way of depicting data. The teachers then consider the information they give.
3. *Reflection and discussion*. Private reflection and discussion with peers and/or the researchers about the profiles then follows. The crucial decisions are next made about which, if any, of the aspects of their school, revealed by the profiles, they will try to change.
4. *Intervention*. The teachers introduce various strategies, typically over a period of several months, aimed at improving the specific aspects (dimensions) of school environment they have chosen. Usually ideas arise during meetings of teachers and from examining individual items in the questionnaire. Most of these ideas are specific to each school and are quite different school from school.
5. *Reassessment*. The *Actual* Form is answered again at the end of the intervention period.

A Case Study

Recently the new form of the SLEQ, including the Work Pressure scale, was used in a 15-teacher primary school. Following the steps, all the teachers filled in the questionnaire, both *Actual* and *Preferred* Forms. Average scale scores were calculated and the profiles were given to the staff. The results, the pre-test lines, are shown in Figure 1 in the form in which they were presented to a meeting of the school. Although there were sizable differences between *Actual* and *Preferred* scores on a number of dimensions, the areas the staff saw as needing immediate improvement were Resource Adequacy, Work Pressure and Innovation. Other dimensions were to be targets for a second round of change attempts.

Next, the staff was divided randomly into small groups to discuss the three areas named above. These groups were asked to consider those and to make suggestions for improvement. The groups then were called together and group session leaders presented a report to the whole staff. Points were discussed at some length and the priorities for action listed in Table 3 were accepted.

For 10 weeks the actions listed in Table 3 were attempted. At the end of this time, the *Actual* form of the SLEQ was answered by the teachers for a second time. Had there been any changes? The results of this assessment are also in Figure 1, the post-test line.

Sizable changes did occur in two of the priority areas. Resource Adequacy increased 2.5 raw score points (about two-thirds of a standard deviation) and Innovation increased 1.7 raw score points (about half a standard deviation). The use of *t*-tests for dependent samples revealed that each of these differences was statistically significant ($p<0.05$).

However, the level of Work Pressure did not change. Nevertheless the staff was still pleased with the results, which indicated that the concentrated effort in the other two areas they had chosen had been worthwhile.

Conclusion

We have reported the development and use of the School Level Environment Questionnaire (SLEQ). The SLEQ is consistent with the theory of environment improvement, makes good sense to practising teachers, is specifically relevant to schools, has minimal overlap with classroom environment scales and is very economic.

Figure 1:
Profiles of Mean School Environment Scores on the SLEQ

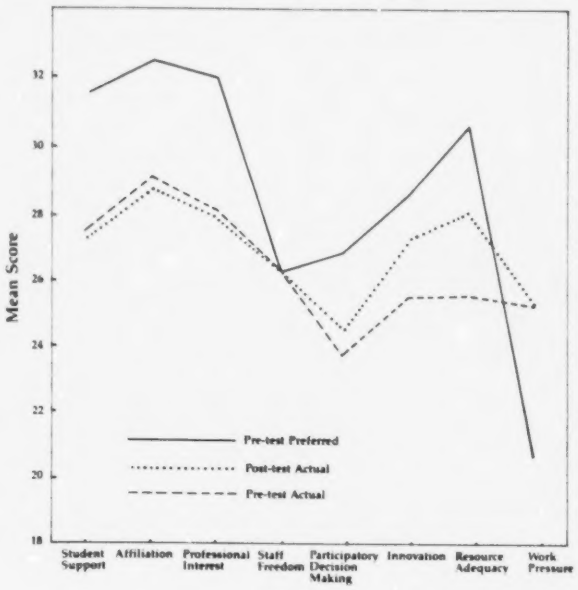

Table 3:
Priorities for Action in Improving School Environment

Resource Adequacy	Conduct a survey of resources in the school
	Develop a plan of attack: immediate, intermediary and long term
	Check and repair already existing equipment
	Develop a plan for increased sharing of resources
Innovation	Conduct staff meetings in individual classrooms. These meetings should be rotated between elementary and infant rooms. Time should be given for the class teacher to comment on organisation, display, problems, etc.
	Free teachers with particular skills to help in other rooms (drama, computers, science)
	Adopt a whole-school theme
	Attempt to 'spot the innovator' (particularly by senior staff)
Work Pressure	Have fewer staff meetings
	Use recess breaks for minor discussions
	Draw on the community for assistance with coaching sporting teams
	Provide opportunities for discussion about meeting the individual needs of children

Each SLEQ scale has adequate reliability and scale independence. Already the SLEQ has been found useful in investigating differences between the climates of primary and secondary schools and teachers have used it to identify actions to improve their school environment. It works.

It is hoped that educational researchers as well as teachers will make use of the SLEQ – it is widely applicable and has been extensively validated. There are school level environment projects to be undertaken similar to those previously completed for classroom-level environment. For example, assessments involving the SLEQ could form the basis for studies of the effects of the school environment on job satisfaction or student achievement or morale.

The SLEQ is likely to provide a useful source of criteria in the evaluation of innovative or alternative educational provisions (e.g., does the school environment change following the implementation of a new curriculum).

Through instruments such as the SLEQ, it is possible to tap important but subtle aspects of teachers' professional lives (e.g., Staff Freedom, Professional Interest, Affiliation, Innovation and Work Pressure).

Assessments of actual and preferred school environments, as seen through the eyes of teachers themselves, will perhaps some day provide a useful foundation on which teachers can base attempts to improve the quality of their school settings and professional lives.

Notes

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Dr Barry J. Fraser is Professor and Director of the Science and Mathematics Education Centre at Curtin University of Technology, G.P.O. Box U1987, Perth 6001, Western Australia.

That environment makes a major contribution to the effectiveness of a school is well documented in

Creemers, B., Peters, T. and Reynolds, D. (eds.) (1989) *School Effectiveness and School Improvement*. Lisse, The Netherlands: Swets and Seitlinger.

The quotation defining environment is from

Tye, K.A. (1974) The culture of the school. In Goodlad, J.I., Klein, M.F., Novotney, J.M. and Tye, K.A. (eds.) *Toward a Mankind School: An Adventure in Humanistic Education*. New York: McGraw-Hill.

The work of R.H. Moos in the early 70s can be found in

Moos, R.H. (1974) *The Social Climate Scales: An Overview*. Palo Alto, CA: Consulting Psychologists Press.

and

Moos, R.H. (1981) *Manual for Work Environment Scale*. Palo Alto, CA: Consulting Psychologists Press.

Examples of earlier school environment instruments include

College Characteristics Index (CCI), which measures student and staff perceptions of 30 environment characteristics. See: Pace, C.R. and Stern, G.G. (1958) An approach to the measurement of psychological characteristics of college environments. *Journal of Educational Psychology*, Vol. 49, pp. 269-77.

and

High School Characteristics Index (HSCI) which is an adaption of the CCI. See:
Stern, G.G. (1970) *People in Context: Measuring Person-Environment Congruence in Education and Industry*. New York: Wiley.

and

Organisational Climate Description Questionnaire (OCDQ) is a widely used instrument. See:
Halpin, A.W. and Croft, D.B. (1963) *Organizational Climate of Schools*. Chicago: Midwest Administration Centre, University of Chicago.

The Work Environment Scale (WES) developed by Moos was designed for use in any work milieu rather than for use specifically in schools. However, the WES's 10 dimensions appear well suited to describing salient features of the teacher's school environment and have been modified for use in schools in our previous research. The word 'people' was changed to 'teachers', the word 'supervisor' was changed to 'senior staff' and the word 'employee' was changed to 'teacher'.

See:

Fraser, B.J., Docker, J.D. and Fisher, D.L. (1988) Assessing and improving school climate. *Evaluation and Research in Education*, Vol. 2, No. 3, pp. 109-122.

and

Docker, J., Fisher, D.L. and Fraser, B.J. (1989) Differences in the psychosocial work environment of different types of schools. *Journal of Childhood Education*, Vol. 4, pp. 5-17.

The Development of the SLEQ:

What the new environment questionnaire would need was first documented in

Rentoul, A.J. and Fraser, B.J. (1983) Development of a school-level environment questionnaire. *Journal of Educational Administration*, Vol. 21, pp. 21-39.

The Validity of the SLEQ:

The validity data (see Table 2) include information about each scale's internal consistency (Cronbach alpha reliability) and discriminant validity (mean correlation of a scale with the other seven scales). The first sample in Table 2 consisted of 83 teachers from 19 coeducational government schools (seven elementary and 12 secondary) in the Sydney metropolitan area. The second sample consisted of 34 secondary school teachers, each in a different government high school in New South Wales. The third sample consisted of 109 teachers in 10 elementary and secondary schools in Tasmania. The teachers in the third sample are the only ones who responded to the *Preferred* Form as well as to the *Actual* Form of the SLEQ. It should be noted that the recently added Work Pressure scale (based on a scale in the WES) was not in the form of the questionnaire which was administered to these samples; hence no statistics for this scale are included in Table 2.

Table 2 shows that the reliability (alpha coefficient) for different SLEQ scales ranged from 0.70 to 0.91 for the first sample, from 0.68 to 0.91 for the second sample, from 0.64 to 0.85 for the actual form for the third sample, and from 0.64 to 0.81 for the preferred form for the third sample. These values suggest that each SLEQ scale displays satisfactory internal consistency reliability for a scale composed of only seven items. The values of the mean correlation of a scale with the other scales shown in Table 2 range from 0.17 to 0.38 for the first sample; from 0.05 to 0.29 for the second sample; from 0.10 to 0.42 for the *Actual* Form for the third sample; and from 0.28 to 0.44 for the *Preferred* Form for the third sample. These values indicate satisfactory scale independence and suggest that the SLEQ measures distinct although somewhat overlapping aspects of school environment.

Improving School Environments:

The successful techniques used for improving classroom-level environment are described in

Fraser, B.J. (1981) Using environmental assessments to make better classrooms. *Journal of Curriculum Studies*, Vol. 13, pp. 131-44.

and

Fraser, B.J. and Fisher, D.L. (1986) Using short forms of classroom climate instruments to assess and improve classroom psychosocial environment. *Journal of Research in Science Teaching*, Vol. 23, pp. 387-413.

The techniques in psychiatric wards etc., are mentioned in R.H. Moos' 1974 work mentioned above.

Conclusion:

A summary of classroom-level climate research is found in

Fraser, B.J. (1989) Twenty years of classroom climate research: Progress and prospect. *Journal of Curriculum Studies*, Vol. 21, pp. 307-327.

Work on how school environment changes following the introduction of new curriculum can be found in

Fraser, B.J., Williamson, J.C. and Tobin, K.G. (1987) Evaluating alternative high schools in terms of their classroom environments. *Studies in Educational Evaluation*, Vol. 13, pp. 211-17.

Teachers might use the SLEQ to assess their perceptions of actual and preferred school work environments as a basis for discussion of improvements in their school work settings which would reduce actual-preferred differences. See Fraser, Docker and Fisher mentioned above.

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item 5

SLEQ

set research information for teachers
number two 1990

School-Level Environment Questionnaire

Developed by
Dr Darrell Fisher
Tasmanian State Institute of Technology
and
Professor Barry Fraser
Curtin University of Technology, Western Australia.

1. Using and scoring the SLEQ
2. *Actual* Form
3. *Preferred* Form
4. Score Sheet

Using and scoring the SLEQ

The scoring procedure is the same for both Forms, *Actual* and *Preferred*.

The items are arranged in cyclic order: the first item measures *Student Support*, the second measures *Affiliation*, the third *Professional Interest*... up to the eighth, *Work Pressure*. The ninth measures *Student Support* (again); the tenth *Affiliation* (again); and so on.

Some items are scored in this direction: 5 for Strongly Agree, 4 for Agree, 3 for Neither Agree nor Disagree, 1 for Strongly Disagree. These items are marked plus (+) in the chart below.

Some items are scored in the opposite direction: 1 for Strongly Agree, 2 for Agree, 3 for Neither Agree nor Disagree, 4 for Disagree, 5 for Strongly Disagree. These items are marked minus (−) in the chart below.

Omitted or invalid responses are given a score of 3.

1. Give a score to each question, using the chart to work out which score to give.
2. Add across the rows.
3. Add total staff scores across the rows.
4. Average the staff scores across the rows.
5. Make a graph (profile) of the results.

Scoring
School Level Environment Questionnaire

Scale	Items and Scoring Direction
Student Support	1−, 9+, 17+, 25−, 33+, 41+, 49−.
Affiliation	2−, 10+, 18−, 26+, 34−, 42+, 50−.
Professional Interest	3+, 11−, 19−, 27+, 35−, 43+, 51+.
Staff Freedom	4−, 12+, 20−, 28+, 36+, 44−, 52−.
Participatory Decision Making	5−, 13−, 21+, 29+, 37+, 45−, 53−.
Innovation	6−, 14+, 22−, 30+, 38−, 46+, 54+.
Resource Adequacy	7+, 15−, 23+, 31+, 39−, 47−, 55+.
Work Pressure	8+, 16+, 24−, 32+, 40−, 48−, 56+.

\+ Items are scored 5 for Strongly Agree, 4 for Agree, 3 for Not Sure, 2 for Disagree and 1 for Strongly Disagree.
− Items are scored in the reverse manner.

Example

Scoring

						Sign	score
1.	SD	(D)	N	A	SA	−	4
2.	SD	D	N	(A)	SA	−	2
3.	SD	D	N	A	(SA)	+	5
4.	(SD)	D	N	A	SA	−	5

and so on.

Agreggating scores for one teacher

Student Support								
Question no.	1	9	17	25	33	41	49	Total
Score	4	3	1	2	5	3	2	20
Affiliation								
Question no.	2	10	18	26	34	42	50	Total
Score	2	3	2	2	1	2	3	15

and so on.

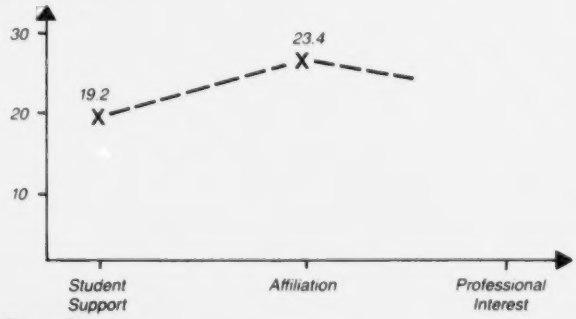
Aggregating scores for whole staff (of 5)

Student Support 20 + 21 + 30 + 15 + 10 = 96
Affiliation 15 + 28 + 24 + 30 + 20 = 117
and so on.

Averaging staff score

Student Support 96 divided by 5 = 19.2
Affiliation 117 divided by 5 = 23.4
and so on.

Graphing (Staff Profile)



Copying

You may copy and use the SLEQ in your school. The authors will be most interested in any results and comments that arise from its use. Correspondence to Dr Darrell Fisher, Department of Adult Learning and Post-Graduate Study, Tasmanian State Institute of Technology, P.O. Box 1214, Launceston, Tasmania, Australia, 7250.

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School-Level Environment Questionnaire (SLEQ)

ACTUAL

Form

There are 56 items in this questionnaire. They are statements to be considered in the context of the school in which you work and your actual working environment.

Think about how well the statements describe your school environment.

Indicate your answer on the score sheet by circling:

SD if you *strongly disagree* with the statement;
D if you *disagree* with the statement;
N if you neither agree nor disagree with the statement or are not sure;
A if you *agree* with the statement;
SA if you *strongly agree* with the statement;

If you change your mind about a response, cross out the old answer and circle the new choice.

1. There are many disruptive, difficult students in the school.
2. I seldom receive encouragement from colleagues.
3. Teachers frequently discuss teaching methods and strategies with each other.
4. I am often supervised to ensure that I follow directions correctly.
5. Decisions about the running of the school are usually made by the principal or a small group of teachers.
6. It is very difficult to change anything in this school.
7. The school or department library includes an adequate selection of books and periodicals.
8. There is constant pressure to keep working.
9. Most students are helpful and co-operative to teachers.
10. I feel accepted by other teachers.
11. Teachers avoid talking with each other about teaching and learning.
12. I am not expected to conform to a particular teaching style.
13. I have to refer even small matters to a senior member of staff for a final answer.
14. Teachers are encouraged to be innovative in this school.
15. The supply of equipment and resources is inadequate.
16. Teachers have to work long hours to complete all their work.
17. Most students are pleasant and friendly to teachers.
18. I am ignored by other teachers.
19. Professional matters are seldom discussed during staff meetings.
20. It is considered very important that I closely follow syllabuses and lesson plans.
21. Action can usually be taken without gaining the approval of the subject department head or a senior member of staff.
22. There is a great deal of resistance to proposals for curriculum change.
23. Video equipment, tapes and films are readily available and accessible.
24. Teachers don't have to work very hard in this school.
25. There are many noisy, badly-behaved students.
26. I feel that I could rely on my colleagues for assistance if I needed it.
27. Many teachers attend inservice and other professional development courses.
28. There are few rules and regulations that I am expected to follow.
29. Teachers frequently are asked to participate in decisions concerning administrative policies and procedures.
30. Most teachers like the idea of change.
31. Adequate duplicating facilities and services are available to teachers.
32. There is no time for teachers to relax.
33. Students get along well with teachers.
34. My colleagues seldom take notice of my professional views and opinions.
35. Teachers show little interest in what is happening in other schools.
36. I am allowed to do almost as I please in the classroom.
37. I am encouraged to make decisions without reference to a senior member of staff.
38. New courses or curriculum materials are seldom implemented in the school.
39. Tape recorders and cassettes are seldom available when needed.
40. You can take it easy and still get the work done.
41. Most students are well-mannered and respectful to the school staff.
42. I feel that I have many friends among my colleagues at this school.
43. Teachers are keen to learn from their colleagues.
44. My classes are expected to use prescribed textbooks and prescribed resource materials.
45. I must ask my subject department head or senior member of staff before I do most things.
46. There is much experimentation with different teaching approaches.
47. Facilities are inadequate for catering for a variety of classroom activities and learning groups of different sizes.
48. Seldom are there deadlines to be met.
49. Very strict discipline is needed to control many of the students.
50. I often feel lonely and left out of things in the staffroom.
51. Teachers show considerable interest in the professional activities of their colleagues.
52. I am expected to maintain very strict control in the classroom.
53. I have very little say in the running of the school.
54. New and different ideas are always being tried in this school.
55. Projectors and filmstrips, transparencies and flims are usually available when needed.
56. It is hard to keep up with your workload.

Photocopy as many as required

School-Level Environment Questionnaire (SLEQ)

PREFERRED Form

There are 56 items in this questionnaire. They are statements to be considered in the context of the school in which you work and your *preferred* or *ideal* working environment.

Think about how well the statements describe the school environment in which you would *prefer* to work.

Indicate your answer on the score sheet by circling:

SD if you *strongly disagree* with the statement;
D if you *disagree* with the statement;
N if you neither agree nor disagree with the statement or are not sure;
A if you *agree* with the statement;
SA if you *strongly agree* with the statement;

If you change your mind about a response, cross out the old answer and circle the new choice.

1. There would be many disruptive, difficult students in the school.
2. I would seldom receive encouragement from colleagues.
3. Teachers would frequently discuss teaching methods and strategies with each other.
4. I would often be supervised to ensure that I followed directions correctly.
5. Decisions about the running of the school usually would be made by the principal or a small group of teachers.
6. It would be very difficult to change anything in the school.
7. The school or department library would include an adequate selection of books and periodicals.
8. There would be constant pressure to keep working.
9. Most students would be helpful and co-operative to teachers.
10. I would feel accepted by other teachers.
11. Teachers would avoid talking with each other about teaching and learning.
12. I would not be expected to conform to a particular teaching style.
13. I would have to refer even small matters to a senior member of staff for a final answer.
14. Teachers would be encouraged to be innovative in the school.
15. The supply of equipment and resources would not be adequate.
16. Teachers would have to work long hours to complete all their work.
17. Most students would be pleasant and friendly to teachers.
18. I would be ignored by other teachers.
19. Professional matters seldom would be discussed during staff meetings.
20. It would be considered very important that I closely follow syllabuses and lesson plans.
21. Action could usually be taken without gaining the approval of the subject department head or a senior member of staff.
22. There would be a great deal of resistance to proposals for curriculum change.
23. Video equipment, tapes and films would be readily available and accessible.
24. Teachers would not have to work very hard in this school.
25. There would be many noisy, badly-behaved students.
26. I would feel that I could rely on my colleagues for assistance if I needed it.
27. Many teachers would attend inservice and other professional development courses.
28. There would be few rules and regulations that I would be expected to follow.
29. Teachers frequently would be asked to participate in decisions concerning administrative policies and procedures.
30. Most teachers would like the idea of change.
31. Adequate duplicating facilities and services would be available to teachers.
32. There would be no time for teachers to relax.
33. Students would get along well with teachers.
34. My colleagues seldom would take notice of my professional views and opinions.
35. Teachers would show little interest in what was happening in other schools.
36. I would be allowed to do almost as I please in the classroom.
37. I would be encouraged to make decisions without reference to a senior member of staff.
38. New courses or curriculum materials seldom would be implemented in the school.
39. Tape-recorders and cassettes seldom would be available when needed.
40. You could take it easy and still get the work done.
41. Most students would be well-mannered and respectful to the school staff.
42. I would feel that I had many friends among my colleagues at the school.
43. Teachers would be keen to learn from their colleagues.
44. My classes would be expected to use prescribed textbooks and prescribed resource materials.
45. I would have to ask my subject department head or senior member of staff before I did most things.
46. There would be much experimentation with different teaching approaches.
47. Facilities would not be adequate for catering for a variety of classroom activities and learning groups of different sizes.
48. Seldom would there be deadlines to be met.
49. Very strict discipline would be needed to control many of the students.
50. I would often feel lonely and left out of things in the staffroom.
51. Teachers would show considerable interest in the professional activities of their colleagues.
52. I would be expected to maintain very strict control in the classroom.
53. I would have very little say in the running of the school.
54. New and different ideas would always be tried out in the school.
55. Projectors for filmstrips, transparencies and films would usually be available when needed.
56. It would be hard to keep up with your workload.

Photocopy as many as required

SLEQ
Score Sheet
Actual Form

1	SD	D	N	A	SA
2	SD	D	N	A	SA
3	SD	D	N	A	SA
4	SD	D	N	A	SA
5	SD	D	N	A	SA
6	SD	D	N	A	SA
7	SD	D	N	A	SA
8	SD	D	N	A	SA
9	SD	D	N	A	SA
10	SD	D	N	A	SA
11	SD	D	N	A	SA
12	SD	D	N	A	SA
13	SD	D	N	A	SA
14	SD	D	N	A	SA
15	SD	D	N	A	SA
16	SD	D	N	A	SA
17	SD	D	N	A	SA
18	SD	D	N	A	SA
19	SD	D	N	A	SA
20	SD	D	N	A	SA
21	SD	D	N	A	SA
22	SD	D	N	A	SA
23	SD	D	N	A	SA
24	SD	D	N	A	SA
25	SD	D	N	A	SA
26	SD	D	N	A	SA
27	SD	D	N	A	SA
28	SD	D	N	A	SA
29	SD	D	N	A	SA
30	SD	D	N	A	SA
31	SD	D	N	A	SA
32	SD	D	N	A	SA
33	SD	D	N	A	SA
34	SD	D	N	A	SA
35	SD	D	N	A	SA
36	SD	D	N	A	SA
37	SD	D	N	A	SA
38	SD	D	N	A	SA
39	SD	D	N	A	SA
40	SD	D	N	A	SA
41	SD	D	N	A	SA
42	SD	D	N	A	SA
43	SD	D	N	A	SA
44	SD	D	N	A	SA
45	SD	D	N	A	SA
46	SD	D	N	A	SA
47	SD	D	N	A	SA
48	SD	D	N	A	SA
49	SD	D	N	A	SA
50	SD	D	N	A	SA
51	SD	D	N	A	SA
52	SD	D	N	A	SA
53	SD	D	N	A	SA
54	SD	D	N	A	SA
55	SD	D	N	A	SA
56	SD	D	N	A	SA

22

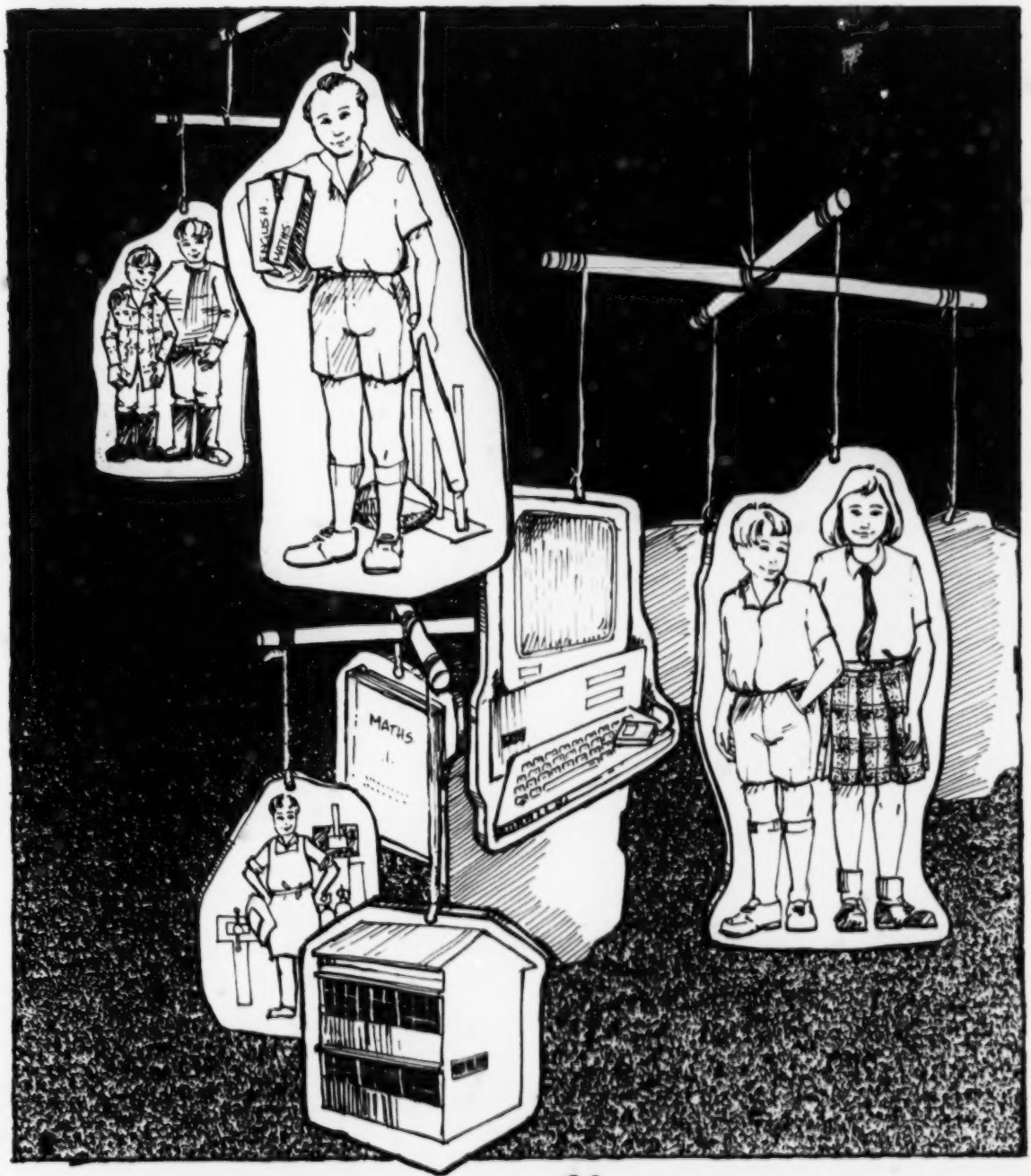
SLEQ
Score Sheet
Preferred Form

1	SD	D	N	A	SA
2	SD	D	N	A	SA
3	SD	D	N	A	SA
4	SD	D	N	A	SA
5	SD	D	N	A	SA
6	SD	D	N	A	SA
7	SD	D	N	A	SA
8	SD	D	N	A	SA
9	SD	D	N	A	SA
10	SD	D	N	A	SA
11	SD	D	N	A	SA
12	SD	D	N	A	SA
13	SD	D	N	A	SA
14	SD	D	N	A	SA
15	SD	D	N	A	SA
16	SD	D	N	A	SA
17	SD	D	N	A	SA
18	SD	D	N	A	SA
19	SD	D	N	A	SA
20	SD	D	N	A	SA
21	SD	D	N	A	SA
22	SD	D	N	A	SA
23	SD	D	N	A	SA
24	SD	D	N	A	SA
25	SD	D	N	A	SA
26	SD	D	N	A	SA
27	SD	D	N	A	SA
28	SD	D	N	A	SA
29	SD	D	N	A	SA
30	SD	D	N	A	SA
31	SD	D	N	A	SA
32	SD	D	N	A	SA
33	SD	D	N	A	SA
34	SD	D	N	A	SA
35	SD	D	N	A	SA
36	SD	D	N	A	SA
37	SD	D	N	A	SA
38	SD	D	N	A	SA
39	SD	D	N	A	SA
40	SD	D	N	A	SA
41	SD	D	N	A	SA
42	SD	D	N	A	SA
43	SD	D	N	A	SA
44	SD	D	N	A	SA
45	SD	D	N	A	SA
46	SD	D	N	A	SA
47	SD	D	N	A	SA
48	SD	D	N	A	SA
49	SD	D	N	A	SA
50	SD	D	N	A	SA
51	SD	D	N	A	SA
52	SD	D	N	A	SA
53	SD	D	N	A	SA
54	SD	D	N	A	SA
55	SD	D	N	A	SA
56	SD	D	N	A	SA

set research information for teachers
number two 1990

Size, Costs, Curriculum
in Secondary Schools

Phillip McKenzie
ACER



Denise Durkin

BEST COPY AVAILABLE

TWO MAIN ARGUMENTS are advanced for large schools: they are able to provide more comprehensive curricula than small schools, and they are less expensive to operate. Do large schools really offer more subjects? Can they do this more economically? An analysis of Victorian Government statistics gives a clear answer: while large schools do have advantages in both of these respects, when they get bigger than about 800 students the gains from further increases in size are relatively small.

There are grounds for expecting that, beyond a certain size, large schools will tend to offer 'more of the same' rather than a greater variety of subjects. Monk in 1986 decided this was true because specialised curricula tend to require small classes and schools will attempt to avoid operating small classes:

> First, the evidence on the learning gains associated with small class sizes is at best mixed... These unclear gains must be balanced against the obvious and large expenditures per pupil that small classes entail...
>
> Second, small class sizes raise equity problems for administrators... If all the classes are of roughly the same size, there is one fewer thing for the administrator to worry about...
>
> Third, the inefficiencies that stem from a failure to specialise may not be very large in any case. The prevailing wage... may be so low that the schools are not able to attract true specialists. Rather, they attract generalists who are interchangeable.

Thomas in 1971 reached a similar conclusion from a slightly different perspective. He argued that the provision of new courses is likely to be relatively costly, not only because class sizes in new programmes tend to be small (in the initial stages) but also because they often require specialised facilities and learning materials. Although large schools may have more capacity to absorb the costs of new courses, beyond a certain enrolment level that capacity will be reduced by the need for very large schools to provide more resources for administration and co-ordination.

These arguments refer to limits on the *willingness* of large schools to offer more specialised curricula. In government school systems, such as those that operate in Australia and New Zealand, there are also likely .o be constraints on the *capacity* of large schools to provide curricula that differ markedly from those in small schools. In these systems the staffing formulae allocate proportionately more teachers to small schools than to large schools. The relatively favourable allocation of teachers to small schools is intended to allow them to provide a curriculum range that is comparable to that of larger schools. It is at this point that the relationship between school size and the operating costs of schools becomes critical. If the staffing schedules aim to achieve curriculum parity between schools of different sizes, at what cost is this achieved?

Measuring Curriculum Provision

Conceptualising and measuring curricula is very difficult. We found the number of different subjects provided in schools of varying sizes, identified the broad curriculum areas represented by those subjects, and calculated the relative allocation of class teaching time to each subject and area. We focused on the 'structure' of the curriculum, as represented by the school timetable. As such, it says very little about the specific content of different subjects, and nothing at all about teaching and learning processes. It is, however, an advance over a simple count of the number of different subjects or courses since it considers several other dimensions of curriculum structure: *breadth*, *depth*, and *access*.

The starting point is the number of classes that a school provides. Classes run for different lengths of time each week, so it is necessary to express the number of classes in a common unit of measurement. In what follows, this is taken to be the number of 250 minute blocks that the class occupies each week. Thus, for example, a school that offered a single mathematics class comprising four 50 minute periods at each of its six year levels would, in total, provide (4x50x6)/250 = 4.8 standardised mathematics classes per week.

The next step involves seeing the total number of classes provided by a school as the product of three variables: the number of broad curriculum areas that those classes represent (breadth); the average number of subjects per broad curriculum area (depth); and the average number of classes per subject (access). The more classes are operated in any given subject, the greater the potential opportunity for students to enrol in that subject should they wish.

This way of looking at curriculum provision provides a link between the allocation of the major resource available to schools, teacher time (as represented in the provision of classes), and the nature of the educational programme that those classes deliver to students:

$$M = B \times D \times A$$

where M = the total number of classes per week (expressed in 250-minute equivalents),
B = the number of broad curriculum areas represented,
D = the average number of subjects per broad curriculum area,
and
A = the average number of 250-minute equivalent classes per subject.

Not only does this approach identify – albeit imperfectly – several important dimensions of curriculum provision, it also makes the tradeoffs that exist between them explicit. In a world of limited educational resources schools cannot *simultaneously* increase the breadth, depth and access of their curriculum. Decisions have to be made about the priorities to be given to these dimensions and difficult choices confronted. Since Australian and New Zealand secondary schools have some curriculum autonomy this suggests that factors other than school size will influence the final shape of school curricula.

Data Base and Methodology

The study used official data on teachers' time allocations collected from government secondary schools by the Victorian Ministry of Education in 1984. For every teacher, information was available on every timetabled teaching class assignment that they had – the subject concerned, the number of teachers involved in taking the class, the number of sessions and minutes per week that the class operated, the number of weeks per year that it ran, the number of students enrolled in the class, and the year level(s) from which they were drawn. From this information a picture of the curriculum provided by each school in the study was constructed.

The basic building blocks of the analysis were the subject labels attached to teachers' class teaching duties. They are shown in Table 1. The nine headings come from a policy document on the desirable shape of a balanced curriculum and were used as a measure of curriculum breadth (B). It

Table 1 *Secondary School Subjects Classified by Broad Curriculum Area*

ENGLISH	SCIENCE	PERSONAL DEVELOPMENT
English	Agricultural Science	Careers
English Literature	Behavioural Science	Health Education
English - Migrant	Biology	Physical Education
English - Remedial	Chemistry	Physical Education - Boys
	Earth Science	Physical Education - Girls
SOCIAL EDUCATION	(including Geology)	Pupil Welfare & Counselling
	Environmental Science	
Environmental Studies	Physics	TECHNICAL STUDIES
General Studies	Physical Science	
(including Integrated Studies)	Science n.e.c	Agriculture & Horticulture Group
Geography		Computer Studies
History	COMMERCE	Electrical, Electronics
Human Development & Society		& Radio Trades
(from Home Economics Group)	Accounting	Food & Catering Group
Humanities - General	Consumer Education	Home Economics
Politics	Commercial & Legal Studies	Metal Trades & Fitting Group
Social Science	Economics	Plumbing & Sheetmetal Group
Social Studies	General Business Education	Textile & Wool Trades
	Typing	Vehicle Trades
LANGUAGES OTHER	Typing & Shorthand (Dacomb)	Woodwork, Furniture & Building
THAN ENGLISH	Typing & Shorthand (Pitman)	Group
French	THE ARTS	OTHER
General Language Studies		
German	Art	Activities
Greek (Modern)	Ceramics/Pottery	Library
Indonesian	Clothing & Textiles	Sports Supervision
Italian	(including Needlecraft)	Other n.e.c.
Japanese	Craft n.e.c.	
Latin	Dance	
Spanish	Drama	
Turkish	Film-Making & Television	
Other Languages	Graphic Communication	
	Metalcraft (including Jewellery)	
MATHEMATICS	Music - Classroom	
	Music - Instrumental	
Computer Science	Photography	
Mathematics - Applied	Woodcraft	
Mathematics - General		
Mathematics - Pure		
Mathematics - Remedial		
Mathematics n.e.c.		

was assumed that a school which provided classes in all nine areas had a broader curriculum than a school with classes from (say) eight of the areas. The data on subject offerings and the total amount of teacher time allocated to class teaching also allowed the estimation of the extent of depth (D) and access (A).

The official data also recorded each teacher's seniority classification and the amount of time they taught at the school. This information, when combined with teachers' salary levels, provided an estimate of the operating costs of schools of different sizes. The data were available for 95 percent (246 schools) of the Victorian government high schools that enrolled students in each of years 7 to 12 (Forms 2 to 7). The schools ranged in size from 76 to 1234 students – the average was 639. By Australian standards, Victorian high schools are relatively small. Using our results for school systems with substantially larger schools must be done with caution.

Regression analysis was used to estimate the relationship between each of the curriculum elements B, D and A and school enrolment size. (The effect of other potential influences on curriculum provision were also investigated, but are not reported here.) The analyses allowed an estimation of how much school size effects the curriculum, as well as whether the relationship was linear in form. These two analyses determine whether size brings curriculum advantages, and whether those advantages approach an upper limit as schools increase in size.

Curriculum Provision and School Size: Results and Discussion

(The information is in Table 2.)

The Number of Subjects

The 'average' Victorian high school in 1984 provided 34 subjects. The largest number, 47, was provided by a school with just over 1000 students. The smallest number, 23, was provided by four schools that enrolled fewer than 400 students. Large schools generally provided more subjects than small schools, although an increase in school size did not guarantee that a greater number of subjects would be provided. There was considerable variation between schools of similar size. For example, the number of subjects provided by schools in the 500 to 599 student band ranged from 26 to 43. Correspondingly, there were many instances where a similar number of subjects was provided by schools of substantially different size. This can be illustrated by schools at the extremes of the enrolment range: the smallest school (76 students) provided 33 subjects, only one fewer than one of the largest schools (1109 students).

Regression analyses indicated that, on average, one additional subject was provided for every 100 students enrolled by schools, when other factors were equal. School size accounted for only 37 percent of the variation in the

Table 2 *Whole-School Curriculum Structure, by School Enrolment*

Number of students	Number of schools	Average number of subjects (1)	Average number of broad curric. areas (2)	Average number of subjects per area (3)	Average number of classes per subject (4)	Average total number of 250 minute classes (5)
<100	1	33.0	8.00	4.13	1.66	54.8
100-199	18	29.1	8.61	3.39	2.56	73.9
200-299	13	29.2	8.31	3.52	3.17	91.7
300-399	23	29.1	8.87	3.29	3.80	109.7
400-499	27	32.6	8.85	3.68	4.24	136.6
500-599	19	35.5	8.84	4.01	4.43	156.7
600-699	32	35.2	8.91	3.96	5.09	177.5
700-799	35	35.6	8.89	4.01	5.70	201.7
800-899	33	36.2	8.97	4.04	6.40	230.1
900-999	22	36.1	8.86	4.08	7.01	251.4
1000-1099	17	38.1	8.94	4.26	7.29	274.7
1100-1199	5	36.8	9.00	4.09	8.27	303.5
1200-1299	1	41.0	9.00	4.56	7.74	317.1
All Schools	246					
Mean		34.1	8.84	3.86	5.19	179.3
Standard deviation		4.5	0.37	0.49	1.57	63.6
Minimum value		23.0	8.00	2.56	1.66	54.8
Maximum value		47.0	9.00	5.22	9.23	317.1

Note: For each individual school the product of columns (2) and (3) equals the value in column (1), and the product of columns (1) and (4) equals column (5). These identities do not always hold for the school groupings shown in the table because the mean values recorded in each column are unweighted.

number of subjects provided by schools. This suggests the important role that other factors play in this aspect of curriculum decision making.

The Number of Broad Curriculum Areas (Breadth)

Almost all of the 246 Victorian high schools provided classes in all of the nine broad curriculum areas. Twenty-eight schools did not provide Languages Other Than English and 11 schools did not provide Technical Studies.

The schools that did not provide classes in Language Other Than English were small, averaging 333 students. In this particular area of the curriculum school size did appear to be an important influence and it is worth noting that 20 were located in small country towns, where language teachers are few. It is also possible that because rural areas generally have fewer students from immigrant backgrounds there may be less demand for language courses. Therefore it is unlikely that size alone prevents the schools from providing a full range of curriculum areas. The 11 schools that did not provide classes in Technical Studies were, on average, larger than the schools that did provide such classes. In this regard small size does not appear to be a barrier to providing a broad curriculum.

There was not a great deal of variation between schools in the number of broad areas that they provided at the whole-school level; and school size accounted for only a small proportion (10 percent) of the variation that did exist.

The Number of Subjects Per Curriculum Area (Depth)

To get the number of subjects provided per curriculum area divide the figure in Column (2) by that in Column (1) in Table 2. The relationship between depth (D) and the three independent variables is an amalgam of the patterns discussed in the two previous sections.

On average, 3.9 subjects were provided per broad curriculum area in the 246 schools. Most schools with fewer than 600 students offered fewer than four subjects per area while those with more than about 600 students provided over four subjects per area, on average. However, as discussed earlier, there was considerable variation between schools of similar size. School size accounted for only 29 percent of the variation between schools in the average number of subjects per area; on average, each additional 100 students was associated with an additional 0.1 subjects per broad curriculum area.

The Number of Classes Per Subject (Access)

Here school size started to have a marked impact on curriculum structure. The smallest schools offered only about two classes per subject per week (in 250-minute equivalent terms), whereas the largest schools provided at least seven. Overall, school size accounted for 88 percent of the variation between schools in this regard. Each increase in school size of 100 students was associated with the provision of 0.5 additional classes per subject, on average.

The average number of classes provided per subject is an indicator of the access students have to subjects of their choice. However, care should be taken in interpreting the data in these terms. Large schools may offer more classes per subject than small schools but through necessity rather than through any conscious effort to facilitate choice. This is a particularly likely to be the case in the junior year levels. A large school that provided (say) six English classes for its 150 year 7 (Form 2) students could not be said to be offering greater student access to English than a small school that offered only one year 7 English class for 15 students. While the results suggest large schools may provide curriculum advantages further analysis is needed for a clear picture.

The Total Number of Classes

There was a very strong relationship between the total number of classes provided and school size, with size accounting for almost all (97 percent) of the variation between schools. This result was not all that surprising – large schools are allocated more teachers and, thus, are able to offer more classes. There was some evidence, though, that the number of classes grew slightly more

Table 3 *Teacher Salary Expenditure Per Student, by School Enrolment Size*

Number of Students	Number of Schools	Average Teacher Salary Expenditure Per Student	Index
<100	1	4 931	242.7
100-199	18	3 105	152.8
200-299	13	2 566	126.3
300-399	23	2 229	109.7
400-499	27	2 056	101.2
500-599	19	1 990	97.9
600-699	32	1 896	93.3
700-799	35	1 819	89.5
800-899	33	1 775	87.3
900-999	22	1 746	85.9
1000-1099	17	1 741	85.7
1100-1199	5	1 691	83.2
1200-1299	1	1 706	84.0
All schools	246		
Mean per school		2 032	100.0
Standard deviation		430	21.2
Minimum value		1 604	78.9
Maximum value		4 931	242.7

Note: The index is based on the mean expenditure per school ($2032) = 100.0

rapidly than the number of teachers as school size increased. This suggests that, on average, teachers in large schools have more contact hours than teachers in small schools.

The close relationship between school size and the total number of classes confirms the important role that staffing formulae (which are based on school size) play in determining the teaching resources that schools are allocated. However, the fact that school size accounted for much smaller proportions of the other variations indicates the importance of local influences on the detail of what curriculum is provided.

Operating Costs and School Size: Results

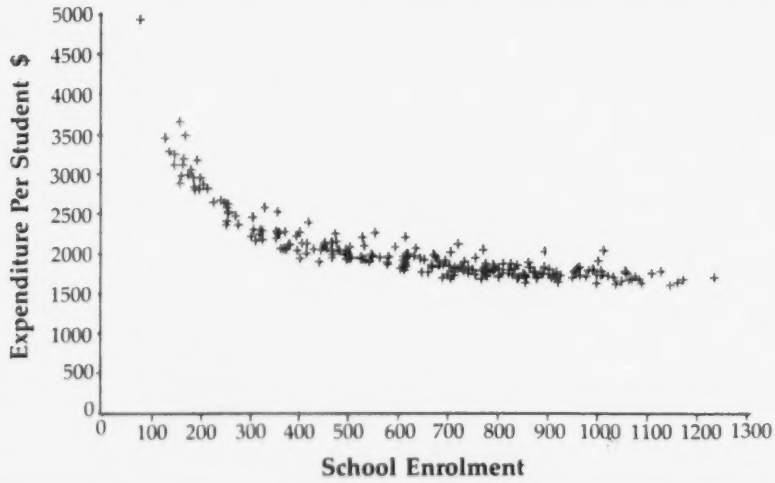
In Victoria, as in most school systems expenditure on teachers' salaries is the largest single component of education budgets so teachers' salaries were used as a proxy for school operating costs. Cost data were not available for several other key resources – most notably land, buildings, capital items, and student transportation and this should be noted because such costs are likely to be related closely to school size.

The relationship between per student (or average) expenditure on teachers' salaries and school enrolment size is recorded in Table 3. Across the 246 schools the average expenditure per student on teachers' salaries was $2,032. There was, however, considerable variation around the mean, ranging from a maximum of $4,931 in the smallest school in the study (76 students) to a minimum of $1,604 in one of the largest (1146 students).

Figure 1 shows clearly the curvilinear relationship between expenditure per student and school size. The relationship was hyperbolic in form: per student expenditure declined at a decreasing rate as school size increased. Once school enrolments exceeded about 800 students the decline in average expenditure associated with further increases in school size was proportionately quite small.

This hyperbolic relationship has also been documented for other Australian government school systems. Essentially it is the result of the policy (expressed in the staffing formulae for government schools) which gives lower student-teacher ratios (and thus higher per-student expenditures) in small schools. In Victoria, at least, the schedules also allocated a slightly higher proportion of senior (and thus more costly) teachers to small schools.

Figure 1 *Per Student Expenditure on Teachers Salaries, by School Enrolment Size.*



Discussion

System-level administrators structure the allocation of resources to schools to ensure that small schools are able to provide curricula comparable with large schools. The success of this policy was evident in the relatively small role that school size played in accounting for variation between schools in two of the three dimensions of curriculum structure that were measured, namely, breadth and depth. School size was far more important in explaining differences between schools in the average number of classes that they provided per subject. However, as was noted, this particular variable was an imperfect measure of the third dimension of curriculum structure, students' access to subjects of their choice.

An important consequence of the policy to provide sufficient resources to small schools was that the per-student costs of operating those schools were relatively high. However, three comments can be made in this regard. First, as a group the small schools enrolled only a small proportion of the high school population. In the present study 13 percent of the schools enrolled fewer than 300 students. In total, those enrolments represented only 4 percent of the total number of high school students. Thus, even though per student expenditures in small schools are high, their combined impact on the total costs of operating the school system, is quite small.

Second, because small schools tend to be located in areas of low population, there may be no practical alternative to maintaining them in their present form.

Third, the data presented here suggested that gains (for curriculum variety and overall costs) from increasing school size appeared to be relatively small once schools exceeded about 800 or so students. Although the generalisability of these results need to be qualified, they suggest that large schools do not necessarily bring the curriculum and cost advantages that are often claimed.

All of this is not to say that large schools should not continue to be provided. The financial gains from large schools, no matter how small, may still be necessary to support those schools which, because of their location, are inevitably small. Whilst there are budget restraints there is no absolute answer to the question of appropriate school size since sizes need to be considered in the context of the viability of the school system as a whole.

Notes

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The idea that large schools tend to offer 'more of the same' can be found in

Monk, D.H. (1986) *Secondary school enrollment and curricular comprehensiveness*. Ithaca, New York: Cornell University, Department of Education.

The quotation is from p. 10.

Thomas's argument about new courses absorbing extra funds can be found in

Thomas, J.A. (1971) *The productive school. A systems analysis approach to educational administration*. New York: John Wiley.

The staffing formulae that allocate proportionately more teachers to small schools is expanded in

McKenzie, P.A. and Keeves, J.P. (1982) *Eight education systems: Resource allocation policies in the government school systems of Australia and New Zealand*. Hawthorn, Vic.: ACER.

The idea that the curriculum has a 'structure' which can be represented by the school timetable is discussed in

Ellem, G. (1986) Timetable analysis: A Tool for school administrators. *Journal of Educational Administration*, Vol. 24, pp. 18-37.

That in a world of limited resources schools cannot simultaneously increase the breadth, depth and access of their curriculum is derived from

Monk, D.H. (1987) Secondary school size and curriculum comprehensiveness. *Economics of Education Review*, Vol. 6, pp. 137-150.

The nine headings found in Table 1 come from

Ministry of Education, Victoria (1987) *Curriculum frameworks*. Melbourne: Author.

Operating costs and school size: results. The most detailed study of school expenditure in Australia is

Commonwealth Schools Commission (1981) *Schools resources study: Part one*. Canberra: Commonwealth Schools Commission.

It estimated that teachers' salaries accounted for just under 80 percent of recurrent public expenditure on Victorian government secondary schools (Commonwealth Schools Commission, 1981). The usefulness of teachers' salaries as a proxy for total recurrent expenditures is also suggested by the evidence that a number of other items of school expenditure, such as administrative outlays and support staff salaries, are highly correlated with expenditure on teachers. This procedure is supported by

Hough, J.R. (1981) *A study of school costs*. Windsor, Berks.: NFER-Nelson.

and McKenzie and Keeves (1982) mentioned above.

The documenting of the hyperbolic relationship between high school size and per-pupil expenditure can be found in

Curtis, C.K. (1981) *An analysis of expenditure in South Australian primary and high schools*. Unpublished Master of Education thesis. Adelaide: Flinders University.

and

Commonwealth Schools Commission (1983) *Schools resources study: Part two*. Canberra: Commonwealth Schools Commission.

Full details of the study from which this article has been derived are written up in

McKenzie, P.A. (1990) *Secondary school size, curriculum structure, and resource use: A study in the economics of education*. Hawthorn, Vic.: ACER. (mimeo.)

The idea that small schools should be to a certain extent funded from the savings made by large schools is found in

Davies T.J. (1969) *School organisation*. Oxford: Pergamon.

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set research information for teachers
number two 1990

EDUCATION AND EMPLOYMENT

Paul Callister
New Zealand Planning Council

A Brief Reply

Ivan Snook
Massey University

In ***set*** No. 1, 1989, Professor Ivan Snook wrote *Inflated Expectations, Qualifications and Job Prospects*. His main thesis was that the statistics for employment in Australia and New Zealand do not make it possible to give unequivocal, automatic, advice to stay on at school. The statistics are of no use in individual counselling. So 'Should I stay at school?' should be in every case an utterly open question, he said.

The article contained a critique of both the 'Official View' (that jobs are becoming increasingly sophisticated and that higher and higher cognitive skills are required to ensure economic growth) and the 'Radical View' (that schools are just vast sorting machines grading children like apples, the worth of the grades for manual, skilled, and professional jobs being set by the state of the economy, not by educational judgement.)

In this item the New Zealand Planning Council defends the 'Official View' and Professor Snook replies briefly.

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Education and Employment

Paul Callister
New Zealand Planning Council

The primary goal of education is to elicit and fortify whatever creative impulse [people] may possess.
Bertrand Russell

MOST PEOPLE would agree that education has a crucial role in giving young people an understanding of themselves and their world, and greater degrees of competence in coping with their lives. But does education also have a major role to play in the job creation process?

In *set* number one, 1989, Professor Ivan Snook explored the relationship between education and unemployment. He argued that staying on at school does not help individuals obtain employment and to the contrary may decrease their chances of obtaining the jobs they had in mind. He went further in arguing that unemployment in general will not be reduced by lifting retention rates or providing more education. Jobs are not requiring increasing degrees of knowledge and skill; rather, he asserted, the reverse is the case.

There is no 'quick fix' solution to unemployment. However, New Zealand Planning Council research does indicate that raising the level of education and skills in the workforce is a key element in the battle against unemployment, particularly if we want our new employment opportunities in high income rather than low wage activities and occupations.

De-skilling or Up-skilling?

A central issue in the employment/education debate is whether tomorrow's jobs will require higher levels of skill, or whether technology is reducing the demands on workers.

Employment statistics show that in both Australia and New Zealand, as in other developed countries, there has been a shift from manufacturing and primary sector jobs to service sector ones, a shift from manual to non-manual work, and an increase in part-time work.[1] Australian research also indicates there has been a major shift into information related jobs.[2] Many of these shifts have required considerable *re-skilling* of the workforce.

Measuring whether this has involved *de-skilling* or *up-skilling* is of course a complex task. Individual case studies can point to examples of both up-skilling and de-skilling occurring within industry groups and even within individual enterprises. In the banking industry, for example, frontline staff now have to understand a wide range of complex products including floating and fixed rate mortgages, deposits varying from debentures to unit trusts, and foreign exchange transactions which include swaps, forwards contracts and futures. They also have to master rapidly changing technology, improve interpersonal skills, and in some cases learn new languages to deal effectively in a global environment. At the same time there is also some evidence that the 'back-room' people, processing the paper work generated, have jobs that are de-skilled.[3] Of real interest, however, is whether companies pursuing an overall up-skilling philosophy are generally more successful than those pursuing the de-skilling route, whether this leads them to be the dominant form of business enterprise in the economy and ultimately therefore, whether over the whole economy up-skilling is occurring.

The relative success of a company will naturally depend on a range of factors, but those pursuing the up-skilling route through techniques such as quality circles and teamworking appear to have an edge over the more traditional operators. The automobile assembly industry is an example worldwide. In the United States evidence points to up-skilling (and more worker participation) in companies exposed to foreign competition, with de-skilling (and increased management control) more apparent in companies protected from competition.[4]

In analysing economy wide skill movements there is a body of overseas literature which points to economy wide up-skilling.[5] In the United States, for example, forecasts by the Hudson Institute show a strong trend towards higher educational requirements among the fastest growing jobs. They estimate that of all new jobs created over the 1984-2000 period, over half will require some education beyond high school and almost a third will be filled by college graduates. Currently only 22% of all occupations in the US require a college degree. Professor Snook relies on anecdotal evidence to support his view of generalised de-skilling. The problem with anecdotes is that it is nearly always possible to find examples which go the other way.

Within New Zealand recent employment trends support the case for up-skilling.

Fastest Growing Jobs 1976-1986	
Statisticians, systems analysts	+125%
Professional, technical n.e.c.	+108%
Economists	+106%
Government administrators	+104%
Broadcasting	+ 91%
Managers	+ 78%
Clerical supervisors	+ 76%
Working proprietors	+ 67%
Jurists	+ 55%
Authors and journalists	+ 47%
Artists and photographers	+ 51%
(ALL OCCUPATIONS	**+ 10%)**

Source: Department of Statistics

All of these occupations either require, or substantially benefit from, higher levels of education. Some of these fastest growing jobs still employ relatively small numbers. Not everyone is going to be an author or a statistician. But a similar pattern emerges when the absolute numbers employed is examined. Managers rise to the top of the list with over 31,000 new positions created between 1976 and 1986, while the largest loss of jobs occurred in the occupations of labouring and construction workers. Since 1986 growth in professional/managerial occupations has

continued, but with large losses in the manufacturing/labouring areas. These movements indicate that the fastest growing occupations require higher levels of education.

To a significant degree the movement to up-skilling or de-skilling will be determined by the particular philosophy of an enterprise or even that of a whole nation. Ken Douglas, of the New Zealand Council of Trade Unions suggests we have no option but to pursue the up-skilling/re-skilling route.

> The reality for the New Zealand economy is that we cannot compete, in Taylorist terms, with low wage production line economies. Not, that is, unless of course we become one ourselves, and I think there is general agreement that we wish to avoid that.
>
> New Zealand's strength, in economic terms, therefore arises out of the relative quality of our education system and the possibilities of a highly skilled and flexible workforce that it creates. In other words, we cannot prosper by trying to outdo low wage economies in an assembly line production approach which is based on breaking work down into simple tasks, and having it performed by unskilled or low skilled workers. What we can do is develop a highly skilled adaptable workforce which concentrates on quality (rather than quantity) production, and innovation. To do this we need to harness the knowledge of workers about the production process, and develop methods of work organisation which allow all participants an input.[6]

A recent survey by the Institute of Economic Research/Institute of Policy Studies showed that managers of individual New Zealand firms believe training/re-skilling is one of the key factors in improving quality, productivity and overall competitiveness of their firms.[7] Diverse lobby groups such as the Council of Trade Unions, Manufacturers Federation, Employers Federation, and the Business Roundtable also agree that education is required for the up-skilling that needs to take place.

Will more education help an individual?

The data indicate that up-skilling is, and will continue to be the dominant trend in New Zealand industry. It therefore seems likely that an individual's chances of obtaining a job will be assisted by the level (and of course nature) of their qualifications. Professor Snook's own figures show that those with higher levels of education are at less risk of unemployment than those with no or few qualifications.

Unemployment Rate (%) by Educational Attainment February 1986

	15-19	20-24	All ages
With post-school qualifications	**16.7**	**9.2**	**5.3**
degree	n.a.	10.7	3.8
trade-technical	14.6	8.4	5.4
Without post-school qualifications	**22.6**	**13.8**	**11.1**
attended highest level	19.3	11.7	10.4*
did not attend highest level	24.3	15.0	11.2
left at 16 or over	22.3	11.9	11.2
left at 15 or under	26.9	20.0	11.3*

Source: Labour Statistics Australia, 1986, 6101, p. 69

* See page 6, point (2).

With a rapidly restructuring economy there is an increased chance of facing unemployment. For most people, however, this period will be relatively short and this is particularly true for qualified people (any period is still likely to be traumatic for most people). A New Zealand Department of Labour survey in 1988 showed that almost half of the *long term* unemployed had left school at age 15 and an estimated 70% had no educational qualification.[8] This combined with the above data would indicate that in general an individual's chance of obtaining employment is enhanced by staying longer in school and then obtaining some post-qualifications. This relationship is also supported by studies in the United States, the United Kingdom and Australia.[9]

Professor Snook however endeavours to counter these arguments by stating that many people 'with advanced credentials take on jobs that are beneath what they would normally have expected'. No doubt this does occur but it is equally likely that many people take jobs above their skill levels. The failure of many small businesses (and some big ones as well) due to lack of managerial, marketing or financial skills points to the need for upgraded skills in many areas.

Will more education help create more jobs?

But even if it is accepted that higher qualifications raise an individual's chance of obtaining a job, there is the view that there is a set number of jobs in the economy with the number primarily determined by government policies. Within this view lifting education retention rates will therefore simply reshuffle those jobs around.

In practice the long term employment/unemployment picture is much more complex. The rate of increase in new jobs needed to reduce unemployment is strongly influenced by the increase in the labour force. In New Zealand in the 1980s there has been a very rapidly increasing labour force, driven in part by the entry of the 'baby boom' generation into the workforce, and in part by an increase in female participation in the paid workforce. Over a longer time period the increase in female participation has been particularly dramatic, rising from just over one third of the working age population in 1966 to just under two thirds in 1986. With Scandinavian countries showing participation rates around 70-80% there is no reason to believe we have reached a limit in New Zealand. With such demographic and social change occurring we have a situation where the numbers of people employed *and* unemployed can increase at the same time.

In New Zealand, if we look at long term changes between the early 1970's and the late 1980's we find that unemployment has increased by over 100,000, employment has grown by over 200,000, while retention rates in the seventh form (Year 12) have risen from just over 11% in 1970 to just under 30% in 1988.

Simply focusing on the link between increasing education and increasing numbers of unemployed is therefore potentially misleading. As an argument against increased participation Professor Snook states that unemployment does not go down as the general level of education rises. Australian and New Zealand data show, however, that it is equally true to state that *employment* rises as the general level of education increases.

In analysing these changes we need to ask some additional questions:

1. What would have happened to employment and unemployment had we *not* improved our education participation rates?

Education and GDP per Capita
OECD countries – age 17

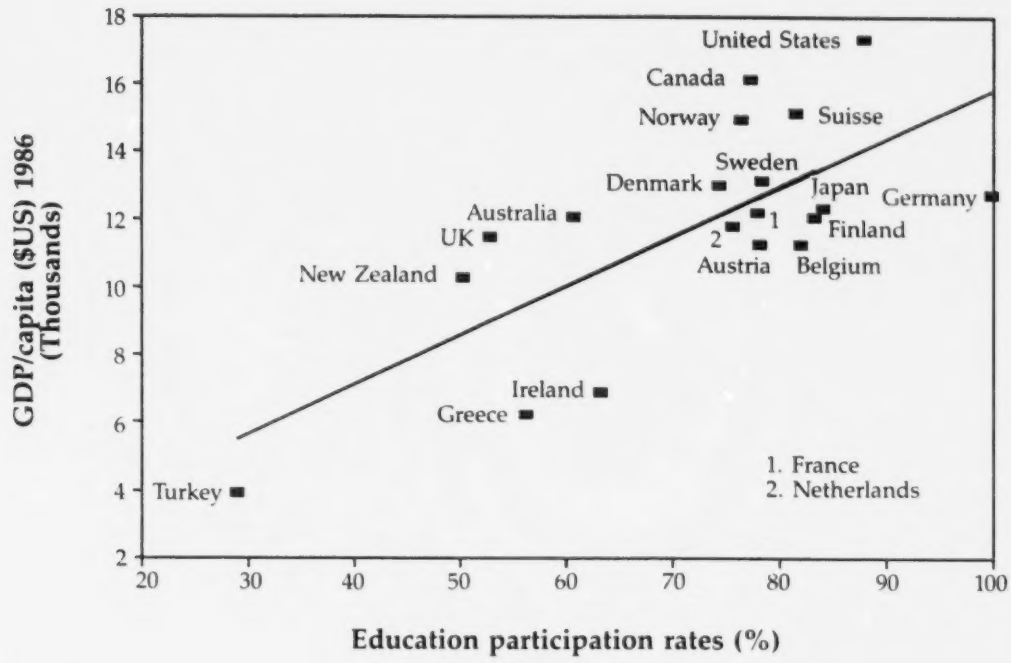

Figure 1.

2. What would have occurred had our participation rates increased at a significantly faster rate?

In relation to both questions we also need to examine participation rates relative to changes in other countries. For example while absolute rates rose in New Zealand between 1982 and 1988, New Zealand's position relative to the rest of the OECD actually declined. Ultimately, however, we need to seek evidence of a link between education, wealth creation and the creation of employment.

Empirical work, such as that by Denison in the United States, indicates that increasing levels of education in the workforce are a major driver of economic growth.[10] A graph showing the relationship between retention rates and GDP per capita also indicates that the link between education and employment is worth exploring. (See Figure 1.)

Such links between GDP and education participation are in themselves of course simplistic, and further analysis is needed to determine the factors leading to strong employment growth. Examining the high employment, high income, and high participation rate societies such as Sweden and Japan provides some guide. In such economies higher levels of education are linked into significantly different work practices, high levels of research and development, high savings, and high levels of investment, such relationships being fostered by both private sector and public sector policies. In New Zealand, at least, there is still considerable debate as to whether such relationships should be fostered by government policies.

If higher education can be combined with these other growth factors this will ultimately lead to higher levels of productivity growth, the key element in securing high wage employment growth. The effect of higher productivity can be demonstrated in economic modelling work.

A joint New Zealand Planning Council/Victoria University economic model shows that a relatively small (when compared with other OECD countries) rise in productivity growth can bring us back to full employment by the mid 1990's.[11] In the modelling exercise the increase in productivity makes the sale of our products on world markets easier and more profitable. Measurements of total factor productivity are designed to include increases in the value of output from both capital and labour. Increasing the value of output of labour can take place in a variety of ways. Here is an Australian view.

> ... technological innovation has often been directed towards producing the same product more cheaply. Quality, innovation and excellence are all contributors to increased productivity, in that they increase the value of the product or service. Value is added by making the most effective use of all the skills that are available.
>
> If the notion of productivity is to be useful to us, we must see it as being about creating new products or services for identified niche markets, about image development and projection to segmented markets rather than mass marketing, and about a commitment to quality which is not about assembly-line inspections, but rather derives from a cultural attitude which is socially and educationally reinforced.[12]

'Added value' comes increasingly from the skilled use of information and knowledge. In a New Zealand context writers such as Dordick support this view.

> New Zealand's economic future may very well rest upon its appreciation of the true meaning of the word 'information'. The nation's farmers and industrialists, bankers and retailers, scholars and students, must recognise that the information era is more than merely a world in which word processors replace typewriters and computers replace calculators. It is an era in which information is the raw material out of which value and wealth is created.[13]

This includes information about consumers, their preferences and where they shop, about raw materials, its

characteristics, and the technologies available for transforming it into products consumers prefer – knowing where to find and how to use this information is crucial to generating more income and more jobs.

The potential for 'added value' and added jobs, through the use of highly skilled information collectors, analysers and users can be seen in a more practical way in the wool industry. Wool is a major (and very traditional) non high-tech, raw commodity export for both Australia and New Zealand. This raw wool is exported to be turned into carpets or fashion garments for the world markets using overseas machinery, overseas design, overseas market research and advertising, creating overseas employment. While we may not be able to compete with the Chinese in factory floor labour costs, in an increasingly capital intensive industry, and using our superior levels of skills, we should be able to produce better designs, better colours, better durability, better advertising and marketing techniques, better delivery schedules, and ultimately more competitive higher quality products.

But what about the size of overseas markets? Measured against the relatively small populations of Australia and New Zealand world markets are huge. The Japanese market, for example, while already a major New Zealand export destination, still remains relatively untapped for many products. In tourism New Zealand currently attracts just under 1% of Japanese travellers, while a range of food and fibre markets in Japan hold considerable potential. But it will not be unskilled labourers who develop the new products and break into new markets. To get cherries into the Japanese market required skilled NZ horticulturalists, scientists, economists and trade negotiators most with high levels of formal education. This breakthrough alone increased New Zealand's horticultural earnings by nearly $1m in 1989, with the potential to dramatically increase this amount in the future.

As already indicated increasing retention rates alone will not guarantee success in reducing unemployment. Factors such as exchange rates, interest rates, level of international demand, the rate of increase in skills overseas, labour market policies, levels of research and development, even the number of forms New Zealand businesses need to fill in, influence the success of enterprises and ultimately the employment creation process. In addition retention rates only tell us about quantity of education, not quality. Quality needs to be continually examined, such as is currently occurring with the latest round of tests by the International Association for the Evaluation of Educational Achievement. Finally linked to both quality and quantity is the need to pay attention to making sure that the right mix of skills are being developed. In the US, for example, there are 500,000 lawyers with 39,000 graduating each year. In Japan there are 17,000 lawyers and 300 graduates every year. The US trains lawyers while Japanese trains engineers.[14] It is perhaps no accident that Japan dominates world trade in automobiles, as well as trade in many other engineering intensive goods. New Zealand needs to determine its own optimal mix of skills, and this is an issue facing parents, students, Boards of Trustees and the new Ministry of Education.

Conclusion

Professor Snook is right in suggesting that increasing retention rates should not be used simply as a way of keeping the unemployed off the streets, or providing more jobs for teachers. He is also right that young people need to explore the issues of unemployment and look critically at its causes. But he is wrong in suggesting that students 'who are enjoying school should be encouraged to stay on, providing they are aware of the fact that so doing may decrease their chance of the sort of job they have in mind.' A return to full employment at high wages will not be easily achieved. But New Zealand Planning Council research does strongly indicate that increasing skills in the workforce will be of assistance to the individual and will ultimately move society closer to this goal. Therefore every effort should be made to encourage *all* students to lift their sights in terms of the quantity and quality of education they seek.

Notes

A more detailed version of these arguments is found in *Tomorrow's Skills*, available from the New Zealand Planning Council, PO Box 5066, Wellington, New Zealand.

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8. Department of Labour, *Survey of Long Term Unemployment*, Wellington, 1989.
9. (a) Ashenfelter, O and Ham J., *Education, Unemployment and Earnings*, Journal of Political Economy, 87(5), Part 2, 1979.
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Education and Employment: A Brief Reply

Ivan Snook
Massey University

THERE is little point in trying to unravel all the twisted strands in the argument from the Planning Council.

(1) In a matter so complex, their arguments are simplistic and undifferentiated. There is, for example, no recognition of the role of government employment policies in the various countries. It is assumed that all countries have a 'market economy' in which there is an *uncontrolled* relationship between education and employment. This is just not so. Japan, for example, has a strongly protectionist policy and it cannot be assumed that any results there can be generalised here. Similarly, there is enormous confusion about 'skills'. What, for example, *is* the relationship between the 'skills' (whatever they are) needed for 'tomorrow' and a lengthened stay at school? Does a sixth or a seventh form (or a polytechnic course) inevitably provide tomorrow's skills?

In the absence of sophisticated distinctions and arguments I can only focus on more precise claims.

I do not believe that their 'research does indicate that raising the level of education and skill in the workforce is a key element in the battle against unemployment'. They *could be* right but the case at present seems more a matter of dogma than of research.

The table on page 2 for example, tells us *nothing* about 'skill' levels or even educational levels.

(2) The Council reprints my table on qualifications (page 3) and draws a different conclusion. My point still stands. Over all age groups the difference in unemployment between those who left school at 15 or under and those who stayed to the end of schooling (at least two more years) was *less than 1%* (to put it mildly, a ver poor 'rate of return').

(3) The figures on G.D.P. and educational levels are at best quite inconclusive – there is nothing like a perfect correlation. Thus, on the graph for example, Germany which has the highest retention rates is only seventh in economic output (GDP). On the other hand, Canada, tenth in retention levels, is second (to the USA) in economic output. Belgium 5th in retention is 14th in economic output, while Denmark, 13th in retention is a comfortable 6th in economic output. In the tables the Planning Council uses in its booklet *Tomorrow's Skills* the lack of correlation between length of schooling and economic output is even more startling for at age 19 Ireland (23.6%) and Sweden (23.5%) are almost the same in retention rate (below both Australia and New Zealand). While Ireland lags in 17th place for economic output, Sweden is near the top.

Even if there were a good correlation this would not show that increased education causes increased G.D.P. – it might show that countries with higher G.D.P. *could afford* to provide extra education. (And motor cars, telephones, etc. I have yet to hear anyone argue that increasing the number of cars or telephones leads to increased prosperity. Such arguments work only if we already have a dogma.)

(4) In an earlier paper I produced Labour Department statistics to show that in 1978 69.3% of the unemployed had no formal qualifications *but 69.2% of the workforce had no formal qualifications either.* Similarly 3.9% of the unemployed had tertiary qualifications while 4.0% of the workforce had them.

I am therefore, unmoved by the Council's 1988 statistics showing the lack of qualifications of the unemployed. Until this is compared with the figures for the workforce as a whole, it will in no way support the Council's view that there is a relationship between unemployment and schooling.

(5) The *Employment Gazette* 1988 showed that in Britain *unemployment* rates were *greater* (not lesser) with higher qualifications. Thus, for example, of those 25-44, unemployment levels were –

12% for those with C.S.E.
13% for those with O levels, and
20% for those with A levels

Staying at school had made the individual's situation worse.

(6) I am arguing only against a *social policy.* It may be in the interests of many young people to stay on at school. It may be in the interests of many others to leave school. In employment terms Australian and New Zealand data tend to support my view; the English data does more than that.

The Planning Council says 'Professor Snook . . . is wrong in suggesting that students "who are enjoying school should be encouraged to do so, providing they are aware of the fact that so doing may decrease their chance of the sort of job they have in mind".' I do not wish to confront dogma with dogma but must simply suggest that my claim is not wrong or even debatable: it is clearly correct.

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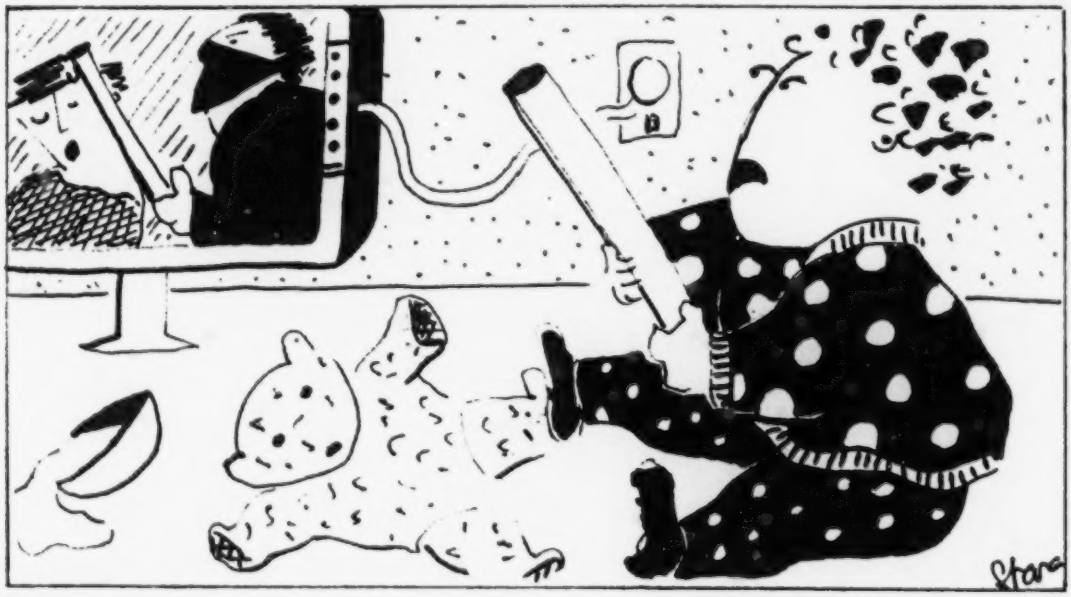
GOOD and BAD
in Prime Time TV for Kids

By Mark Dewalt
Susquehanna University



Introduction

THE AVERAGE FAMILY in the USA watched television 49 hours and 48 minutes per week in 1987. That was a reduction from the 50 hours and 16 minutes watched per week in 1986. This slight reduction did not assuage the fears of many groups and individuals, including teachers, reporters, parents, researchers, the public interest group *Action for Children's Television*, and the *American Academy of Pediatrics*. They are concerned with the amount of television viewing and what the television characters do. Both are legitimate concerns.

By the time children graduate from high school they will have watched approximately 18,000 hours of television, and have spent more hours watching television than in school.

TV's effects

A survey by *Parents* magazine indicated that 60% of parents feel that most TV programmes were not worth watching and 72% said that there was too much violence. Furthermore, the American Academy of Pediatrics believes that TV viewing exposes children to too much violence, sex, drugs and alcohol, and that their depiction implies that everyone indulges in violence, sex, drugs and alcohol and that they are risk-free. Postman believes that televiewing has a pervasive impact on both children and adults, and his book, *Amusing Ourselves to Death* indicates that important national issues are being decided, increasingly, by appearances (which is what TV does best) rather than by understanding the issues.

Violence

Numerous researchers have studied the effects of television on reading achievement, writing ability, imagination and aggressiveness. One such researcher is Huesmann who reported in 1984 that boys who strongly identify with violent TV characters are more prone to aggressive behaviour. Further research by Eron indicated that the amount of TV violence children view when they are 8 is the best indicator of how aggressive they will be when they are 19; in fact, televiewing at the age of eight correlates with the type of crimes they will commit. Finally, *Newsweek* reported on the growing problem of kids and guns. The article pointed out that constant exposure to violence on television can desensitise children to the effect of firearms. The article also pointed out that fighting is often portrayed on TV as being glamorous and as the best, immediate, solution to a character's problems. The depiction of violence is even more critical to the very young viewer; Weissbourd discovered that children under the age of three have difficulty understanding the concept of make-believe. To them a person who is shot on television actually has been shot.

The Three Rs

Unfortunately, the results of acted violence on TV are not the only negative effects of television. Several research projects show that poor success in mathematics, reading and

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writing go hand in hand with long hours of TV watching. Maybe poor readers take up TV watching as a substitute, but it is just as likely that long hours in front of the screen inhibit learning these skills. There is evidence that this is so. Comstock reports from a 1970-80 California study of over 500,000 sixth and twelfth grade students that the number of hours spent watching television was negatively related to reading, writing, and mathematics achievement. A finer analysis of results by Fetter, studying over 10,000 sixth graders, indicated that one to two hours per day watching TV does not hinder reading achievement; however, reading achievement decreases as viewing time increases beyond two hours per day. Similar findings were reported by Williams and colleagues who reviewed many research projects and found that television viewing has a slight positive effect on school achievement up to ten hours per week. But more than ten hours per week has a negative effect.

Imagination

Another problem, and one much more difficult to pin down, is the effect of frequent viewing on the imagination. It appears that the imagination is not stimulated when one watches TV because TV *gives* the viewer the images, unlike reading which requires us to create images from words. It is maintained by many educators that reading improves our imaginative abilities and creative writing ability in a way TV does not. Thus an excessive amount of televiewing may limit a child's writing ability. Pierce found that the writing ability of middle school students was negatively related to the amount of time spent watching television. And many teachers will know the experience of Joan Schloss, a teacher of nine-year-olds, who said 'When I was reading students' stories for a young author's project, I was shocked because the content was so violent. The stories reflected what children see on TV – monsters and killing. There was nothing creative or imaginative about them.'

Time

Watching television not only affects reading achievement, imagination, and aggressiveness, but it takes time away from other important activities. Many teachers are concerned with the child who continually stays up late watching television and as a result is fatigued during school. Other problems caused by frequent televiewing are less time spent working on homework, conversing with family members, engaging in sporting activities, playing, and reading for pleasure. For example, a study conducted at Tufts University indicated that United States young people became more obese from 1960 to 1980 and that one of the factors was excessive television viewing.

Researching the Facts

However, a lot of claims about the influence of TV rely on phrases such as 'there is too much shooting.' Exactly how much is there? We need to know. Calculations have been made by researchers such as Michael Liberman who in ***set*** No. 1, 1986, item 11, has an article with an analysis of the vocabulary and syntax of popular children's programmes.

It has been assumed that TV has *poor* models for children. Poor models have in fact been counted, and preached against, and rightly so. But *good* models have not been counted, nor their effects looked at. This research project began this task. The research needed to know what good and bad actions were being shown on TV, but it is also needed to know which were being seen by children – which programmes they were watching and the incidence of these models on 'their' programmes. Therefore the first section of the project had trained observers watching TV, the second part asked children which programmes they watched and their likes and dislikes.

Part 1, watching TV

In our examination of actual programmes 37 observers were trained, then assigned shows to watch. They did not judge behaviour to be good/bad, appropriate/inappropriate, but simply noted its occurrence. The eight things they were watching for were (1) use of mathematics, (2) reading, (3) positive reference to religion, (4) cigarettes, (5) alcoholic drinks, (6) someone attacked, (7) people shot at, (8) people killed.

Sixty-two prime-time television shows were watched for a month. TV movies, sports events, variety shows, commercials and news reports were excluded.

Reading was the action which occurred most often. The average was 4.2 times per hour (see Table 4, Total Sample). The incidence of drinking was 2.4 times per hour, while people were attacked 1.2 times per hour. People were shot at at the rate of .9 per hour and people were killed at the same rate. Cigarettes were smoked on the average of .8 per hour. The use of mathematics occurred at the rate of .4 times per hour and positive references to religion were made .5 times per hour. Furthermore, 129 of the 162 episodes observed did not have any use of mathematics and 132 of the episodes did not have a positive reference to religion.

These are the figures for every sort of TV show, but most children have favourite shows. The second leg of the research discovered what these were. It is when the incidence of mathematics, reading, etc., for the children's favourite shows is discovered that even more interesting facts are seen.

What kids like

A stratified sample of 1,042 children aged 6- to 11-years-old was chosen, urban and rural, from several states, including minority groups. An 'interest inventory' was mailed to their teachers who assisted the students, as needed, in completing the inventory and returned it to the researchers. The results are in Tables 1, 2 and 3.

Table 1

Children's Most Liked Prime-time TV Shows

TV Programme	Frequency of children who picked as 1 of 3 favourites	%
Alf	387	37
The Cosby Show	265	25
Growing Pains	104	10
Who's the Boss?	87	8
Family Ties	81	8
Rags to Riches	57	5

Table 2

Favourite Subject of Children in the Sample

Subject	Frequency	%
Math	434	42
Gym	154	15
Reading	137	13
Science/Health	104	10
Art	69	7
Spelling	66	6
Other Language Arts	42	4
Social Studies	31	3
Music	25	2
Recess	18	2
Handwriting	8	1
Library	6	1

Table 3

Favourite Free Time Activity of Students in the Sample

Activity	Frequency	%
Bike riding	158	15
Playing with friends	102	10
Watching TV	102	10
Playing	97	9
Football	82	8
Reading	65	6
Playing outside	34	3
Playing games	29	3
Playing school	24	2
Pets	23	2
Visiting relatives	22	2
Shopping	21	2
Drawing	19	2
Skateboarding	19	2
Swimming	17	2
Soccer	15	1
Basketball	15	1
Fishing	11	1

The responses to question 1, 'What is your favourite TV show?' are displayed in Table 1. *Alf* and *Cosby* were the clear favourites of the children with *Alf* being selected by 37% of the children and *The Cosby Show* being selected by 25% of the students. Forty-one percent of the students reported some type of cartoon as one of their favourite shows, and only four students did not have any favourite television shows, three of whom did not have a television in their home.

The same students also answered the question, 'What subject do you like best in school?' The results displayed in Table 2 indicate that mathematics was clearly the favourite subject of the children in the sample (42%) while 29% of the children indicated reading to be their favourite subject. The students were also asked to indicate their favourite free time activity. These results, which are listed in Table 3, indicated that 15% of the students liked bike riding the best. Watching television was the favourite free time activity of 10% of the students.

The students were also asked to indicate the best book they had read. The students selected 654 different books with no single book being selected by more than 2% of the students.

Behaviour children see

Of all the good and bad behaviour children see modelled on their favourite TV programmes reading tops the list – it is depicted 7 times an hour. Positive references to religion, smoking and people being attacked, shot or killed were not displayed on these shows and drinking occurred only 0.1 times per hour. The favourite programmes of the children had fewer people being attacked, shot at, and killed than the total sample. The children's favourites also had less smoking, drinking, and fewer positive references to religion than the full 62 shows. Conversely, the children's shows depicted much more reading per hour than the total sample.

Behaviour adults see

Also fascinating is the fact that if Americans watched nothing but their five favourite shows they also would see no cigarettes and no people being attacked, shot at or killed. Reading occurs in these programmes at the rate of 5.9 times per hour while mathematics is used 0.3 times per hour. People drink alcohol 3.6 times per hour (rather more than in all shows together) but positive references to religion are the same.

The results of this 1987 study closely match those found by Dewalt and Ossenfort for prime-time programmes in 1986.

Discussion

Both positive and negative behaviour occurs on prime-time television. Reading occurs on the average of 4.2 times per hour, but people were attacked 1.2 times per hour, people were shot 0.9 times per hour and people were killed 0.9 times per hour. However, as one observer indicated, they would not have noticed the reading if it had not been their job to note it down.

A second important finding of the study is that both the children's top five favourite shows and the USA's top five shows had very few instances of people being attacked, shot, and killed. This is encouraging because it may indicate a trend away from violence as an essential ingredient of television programmes.

Very many ways of behaving were not measured. We did not measure references to sex, verbal abuse, swearing, chase scenes, drugs, stealing, kidnapping, and verbal threats. One observer asked, 'Why don't you measure verbal abuse? I hope you do next year, this show is just terrible.' Another observer refused to watch another episode of a show because of the poor quality of the programme which became apparent when she took time to record the behaviour exhibited by the

Table 4

Means and Standard Deviations for Each Behaviour Seen on Prime Time TV

	On Total Programmes in Sample		On Children's Favourite Programmes		On American Populace's Favourites	
Behaviour	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
Mathematics	0.4	1.1	0.4	1.1	0.3	1.5
Reading	4.2	5.6	7.0	5.5	5.9	4.8
Religion	0.5	1.4	–	–	0.5	1.9
Cigarettes Smoked	0.8	1.9	–	–	–	–
Alcoholic Drinks	2.4	4.1	0.1	0.5	3.6	8.2
People Attacked	1.2	1.9	–	–	–	–
People Shot	0.9	2.6	–	–	–	–
People Killed	0.9	2.3	–	–	–	–

Children's Favourites – Alf, The Cosby Show, Growing Pains, Who's the Boss?, Family Ties

American Populace Favourites – The Cosby Show, A Different World, Cheers, The Golden Girls, Growing Pains

characters. It should also be noted that the study did not measure many aspects of good actions and positive messages which some programmes convey. For example, some programmes have addressed the problem of adult illiteracy.

The fact that a positive reference to religion occurred only once every two hours should send a strong message to the leaders of religious groups. The average family spends nearly 50 hours per week watching television, which leaves little time for religious study or for aiding those in need.

Parents should be aware of both the amount of time their children watch television and the content of the programmes. They should make sure that televiewing does not take time away from other important activities such as playing, reading, conversing with family members, and homework. Families who have participated in research on the effects of having no TV for a while usually see reading and conversation between family members increase. The families found this very encouraging. Unfortunately, when the study ends most families start watching television again; reading and family conversation return to the pre-research level.

Parents who are interested in reducing excessive televiewing by their children should remember that if they want their children to watch less television they should provide or suggest something else for them to do. For example, they should provide plenty of appropriate reading material for their children, take them to libraries so the children can select their own books; they should model good reading habits themselves, and read to their children every day. Tips for reducing time spent televiewing include:

1. Turn off the television when the programme is finished.
2. Don't be afraid to say NO to certain programmes or televiewing in general.
3. Set limits on number of programmes per week and then work out a schedule of viewing with your children.
4. Reduce the number of television sets.
5. Gradually reduce your child's televiewing to one hour or less per school day.

Parents also need to help their children realise that what they view on television may not be acceptable behaviour in their home or neighbourhood. As often as possible parents should view the programmes with their children and discuss the consequences of violence, the fictional nature of the programmes, and selling techniques used in commercials.

Parents can monitor television programmes as done in this study. They can then restrict their children's viewing to shows with acceptable patterns of behaviour. As one Susquehanna University student stated 'I wouldn't want my own children to grow up in this kind of [violent] atmosphere so why would I want them to watch TV when this atmosphere is so prevalent.'

Notes

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He gratefully acknowledges the efforts of the 37 observers, 35 teachers, and 1042 children who participated in the study. Special thanks go to Susquehanna students Laune Erickson, Allison Hirschman and Kristen Weaver who spent many hours on the project.

The 1986–7 figures for USA television watching are from the
A.C. Nielson Company 1987 year-end report, and
Baker, K. (1988) Americans have more TV's, watch less, *Sunbury News Item*.

The survey by *Parents Magazine* is by I. Guller and can be found in the May 1987 edition, p. 32.

The details for Postman's book are
Postman, N. (1987) *Amusing Ourselves to Death*, New York: Penguin Books.

That boys strongly identifying with violent TV characters are more prone to aggressive behaviour is detailed in
Heusemann, L., Lagerspritz, K. and Erou, L. (1984) Intervening variables in the TV violence-aggression relation: Evidence from two countries, *Developmental Psychology*, Vol. 20, No. 5, pp. 746-775.

That the amount of TV viewing at 8 is the best indicator of aggressiveness is written about in
Faivelson, S. (1987) Verdict on TV violence, *Women's Day*, p. 24.

The *Newsweek* article on the problem of children and guns was written by George Hackett and others and is in the edition of January 11, 1988, pages 18–19.

Children's difficulty with make-believe and reality is detailed in
Weissbourd, P. (1985) How much are children aware of? *Parents*, p. 124.

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and
Searls, D., Mead, N. and Ward, B. (1985) The relationship of students' reading skills to TV watching, leisure time reading, and homework, *Journal of Reading*, pp. 158–162.

The projects mentioned are
Comstock, G. (1982) Education and television: The persistent challenge, *Television and Children*, pp. 9–13.
and
Fetter, M. (1984) Television viewing and school achievement, *Journal of Communication*, Vol. 34, No. 2, pp. 104–118.
and
Williams, P., Haertel, E., Haertel, G. and Walberg, H. (1982) Impact of television on school learning: A research synthesis, *American Educational Research Journal*, Vol. 19, pp. 19–50.

That imagination is not stimulated by TV is discussed in
Singer and Singer (1979) Is human imagination going down the tube? *The Chronicle of Higher Education*, p.56.
and
Winn, Marie (1977) *The plug-in drug*, New York: Viking.

That writing is affected by a lot of time watching TV is in
Peirce, Kate (1983) Relation between time spent viewing television and children's writing skills, *Journalism Quarterly*, Autumn, pp. 445–448.

The link between obesity and TV viewing comes from
United Press International (1987) Obesity on the rise, *Sunbury News Item*.

The 1986 study which the present study results closely match is
Dewalt, M. and Ossenfort, S. (1987) *Reading and Prime-time Television*. Paper presented at the Eastern Educational Research Conference annual meeting Boston.

A study of what happened when families stopped watching TV is mentioned in
Winn, Marie (1977) *The plug-in drug*, New York: Viking.

Suggesting something else to do is outlined in
Slavenas, R. (1984) TV or not TV, is that the question? *Early Child Development and Care*, Vol. 13, pp. 377–389.

Further Reading

Parents concerned about the amount of television their children are watching, or the amount the family is watching should read one or more of the following:

Potter, R. (1981) *The positive use of commercial television with children*, Washington: National Education Association.
Charren, P. and Hulsizer, C. (1986) *TV smart book for kids*, Dutton.
Winn, Marie (1977) *The plug-in drug*, New York: Viking.
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number two 1990

GIRLS ARE BETTER THAN BOYS?

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TWO RECENTLY PUBLISHED REPORTS from the Northern Ireland Council for Educational Research contain evidence on the comparative performance of boys and girls in public examinations at 16. They show girls outperforming boys (even after allowance is made for ability level).

This is particularly significant in Northern Ireland because in Northern Ireland there are still Grammar schools. A lot hangs on your passing or failing an exam called the 'eleven-plus'. If you pass you will be offered a free place in a Grammar school, a school with an 'academic' syllabus which will open up chances for entry to University and the professions. If you fail the eleven-plus you will probably go to a school which does not aim to get you to university; the professions will be, virtually, closed to you. Therefore, for the intellectual health of the country, and for equity in selection, the eleven-plus exam has been two verbal-reasoning-type tests, taken in the 1st term of the final year of primary schooling. It is said to test knowledge and educational aptitude. The top 27% of boys and the top 27% of girls qualified for a non-fee paying place in a Grammar school. Was this fair?

Boys and girls were treated as separate (but equal?) populations. This 'discrimination' was justified in 1984 by Nicholas Scott, the then Under-Secretary of State with responsibility for Education in Northern Ireland:

> The present procedure, which is designed to select those most likely to benefit from academic courses, takes account of the differing intellectual maturity between boys and girls, but not by making adjustments to scores. I am fully persuaded that our procedure is fair to all the children.

In other words, girls were expected to have higher attainment at age 11, but boys were expected to have caught up at some later stage. If this premise was valid, then to treat boys and girls as a single population at 11 would, in fact, discriminate against boys.

The two reports, *Pupils in the Border Band* and *Transfer Pupils at Sixteen* both suggested that the premise was not valid. Studying 484 15-year-olds, the *Border Band* study showed that, girls, on average, achieved the equivalent of nearly one 'O-level' exam pass more than the boys. Significantly more of the girls (74.4%) than of the boys (57.5%) achieved four or more 'O-level' passes, the minimum level of attainment necessary to retain or obtain a place in the sixth form of a Grammar school.

The *Transfer Pupils at Sixteen* study used a larger sample of 1500 pupils, randomly drawn from the list of pupils transferring from primary to post-primary schools in 1981. On average and total attainment scores, and the four 'O-level' criterion, girls did better at 16 than boys. More importantly, this was true also for girls and boys with the same grades in eleven-plus.

These results should not have come as a complete surprise to the Department of Education in Northern Ireland: their most recent School Leaver Statistics show girls outperforming boys.

The Test Case

Following the publication of *Transfer Pupils at Sixteen* the Equal Opportunities Commission decided to support a test case alleging that the policy of treating boys and girls as separate populations amounted to sex discrimination. The parents of four girls, who had taken the eleven-plus examination in 1987 and who had been deemed not qualified for a Grammar school place, argued, on the basis of their school work, that their daughters had probably obtained better marks on the tests than boys who had qualified for grammar school places. As background evidence the Equal Opportunities Commission submitted copies of *Pupils in the Border Band* and *Transfer Pupils at Sixteen* with the High Court Judge. The Court therefore had two issues to decide on: first, whether or not the policy of separate ranking for boys and girls in the selection procedure was illegal, and second, whether or not the four girls whose parents had brought the case had themselves been discriminated against.

On 1 July 1988 the Judge ruled that the Department of Education's policy of separate ranking at 11 did amount to sex discrimination and was therefore illegal. On 6 July the Department announced that the policy of separate marking would cease and that the marks for the 1987/8 Transfer age-group would be reviewed such that the entire age-group would be treated as a single population. On the basis of the review an additional 305 girls fell within the top 27 percent of marks and were awarded qualified status. Also, the Department announced that any qualified boys who, in consequence of the review, had been displaced from the top 27 percent would nevertheless retain their grammar places.

The Education and Library Boards are currently trying to place in Grammar Schools those affected girls who wish to avail of this opportunity. Of the four girls involved in the test case, at least three were not among the extra 305 qualifiers. However, these three girls may yet obtain

grammar places. After the Department's initial response to the Court's ruling, the Equal Opportunities Commission argued that any girl who obtained marks equal to or above that of the lowest qualified boy, should be declared qualified.

As a result of the Court's July ruling just over 400 boys, who had been in the top 27 percent of boys' marks, were displaced from the top 27 percent of all pupils' marks. The Equal Opportunities Commission argued that the Department's decision to allow these boys to retain their non-feepaying places in Grammar schools amounted to sex discrimination and that any girls with marks equal to or above the lowest qualified boy should be offered a free grammar place. On 20 September the Judge ruled in favour of this argument and a further 555 girls were offered non-feepaying places in grammar schools. It is not known how this affected the girls involved in the test case.

Lessons

The research findings and the outcome of the subsequent court case raise a number of important questions, for educationalists and researchers in particular, and for society more generally.

Firstly, the case raises some questions for educationalists on the efficacy of ability tests. We can think of the two main types of tests that are given to children as (a) curriculum-based tests of achievement which seek to determine the extent to which children have acquired some particular, specific, knowledge, and (b) tests of ability which should reflect more general knowledge and a talent for a certain type of learning. The eleven-plus was designed as an ability test, and used in Northern Ireland to select those pupils who should most benefit from the academic curriculum of a grammar school. Ability tests were preferred over knowledge tests for selection to grammar schools since knowledge-based tests were thought to be too heavily influenced by such factors as home background.

In the court case this background was irrelevant as far as the judge was concerned: he was solely interested in the outcome of the tests vis-a-vis sex discrimination. Furthermore, the Department of Education ignored the rationale of its own tests when it decided to allow the boys who had originally 'passed' the eleven-plus, but were then displaced from the top 27%, to retain their grammar places. Furthermore, Wilson (1987) has pointed out that in the 1950s approximately 15% of the transfer age-group were deemed to have qualified on the eleven-plus, but by the 1980s this had risen to almost 30%. It would seem that suitability for a grammar school education is more related to the number of grammar places available than to any abstract criterion of suitability.

The second issue is of particular relevance to researchers, but is important also for those generally interested in the formation of social policy. At the time of the research into the Transfer Procedure, NICER was almost wholly funded by the Department of Education in Northern Ireland. However, NICER was free to publish its research findings. This was important because it allowed a third party, in this case the Equal Opportunities Commission, to draw upon those research findings when launching its legal challenge. In the interests of free and democratic discussion on social policy it is important that research results are openly and widely available.

Thirdly, a number of questions are raised for feminists and those interested in the issue of gender equality. Feminists may say, one hopes with their tongues in cheek, that the NICER research confirms what they already knew, i.e., that girls are intellectually superior to boys. However, Northern Irish society differs little from most other societies in the generally subordinate role allotted to women. Thus, if girls out-perform boys at school at the ages of eleven and sixteen, what happens afterwards to set limits on women's performance in the labour market? Two possibilities suggest themselves. The first is that in later stages of the educational process women are shunted into curricular ghettoes that limit their options in the labour market; in other words, what people are qualified *in* over-rides qualifications per se. The second possibility is that discrimination against women in the labour market is even stronger than might previously have been thought. It would seem that any initial self-congratulation on the NICER findings by feminists ought, perhaps, to be replaced by more sober reflection by everyone on the wider implications for women in society.

The fourth and final set of questions raised by the episode concerns the linkage between educational policy and equal opportunity. At the time the eleven-plus was devised, equal opportunity for women or members of ethnic minorities was not given the priority properly afforded from the 1960s onwards. Whilst life chances hang on the outcomes of exams, with national qualifications giving entry to further education, better paid jobs and a better life style, debates about what tests measure are far from academic, and are not the sole perogative of educationalists. At the extremes, poor testing could exclude Einsteins from Mathematics, put Calibans into haute couture. At the very least, poor testing, including that which reflects older stereotyped notions of ability and development, could mean that particular categories of people will have to put up with less than fulfilling lives. If educationalists do not look to their techniques and methods in the light of the wider commitment to equal opportunity, it could happen that, as in Northern Ireland, other people do it for them.

Notes

Dr A.M. Gallagher worked for the Northern Ireland Council for Educational Research between 1985 and 1987 and is currently Research Officer at the Centre for the Study of Conflict, University of Ulster at Coleraine, Northern Ireland.

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Copies of the NICER *Transfer Procedure Project* reports can be obtained from the NICER Research Unit, Queen's University, Belfast.

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SMALL CHILDREN SOLVE BIG PROBLEMS

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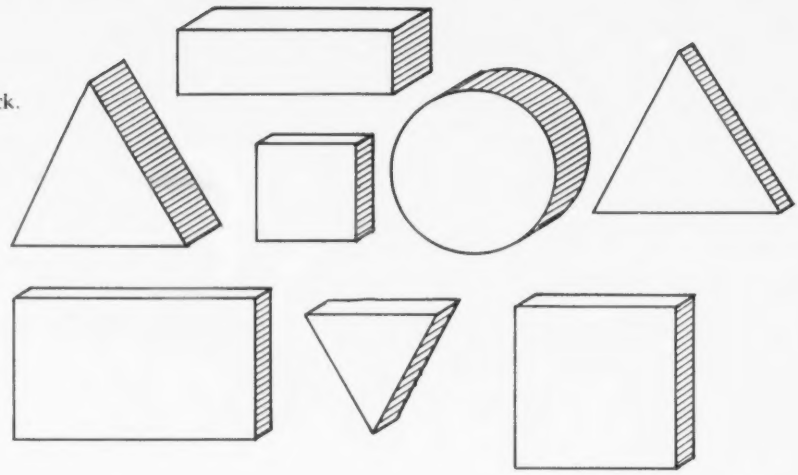
Figure 1.

Try your hand at this problem.

Use the clues to find the special block.

Clues:
The block is not thick.
It is not a triangle.
It is not large.



What method did you use to arrive at your answer?

THIS PROBLEM was given to 52 5-year-olds, in a quiet room of their school. The blocks were there and the clues spoken. Forty-six identified the right block and with very little delay; once the last clue had been given, the children pointed immediately to the correct block.

When we analyse the logical thinking required, we realise just how cognitively adept young children are when they commence their school lives. Yet research has tended to highlight what young children can *not* do. The result is that children's competence as thinkers and problem solvers has been underestimated. By highlighting the cognitive talents of young children we can see how to enrich children's problem-solving experiences.

Past Limitations

The theories of Jean Piaget have been the most influential on our thinking about children's thinking. However, they portray young children as limited in their ability to reason logically or inferentially or to think intelligently in general. If you set out to teach only the range of educational experiences which fit Piaget's stages of cognitive development you will restrict your teaching. Piaget's experiments were based on sophisticated scientific phenomena and were frequently accompanied by abstract instructions and unfamiliar apparatus. Consequently, children's poor performance on many Piagetian tasks could have been due largely to their failure to understand the instructions and to the meaningless nature of the task materials. In the 'colouring liquids' experiment, for example, children were presented with containers of different chemical substances which they were to mix in all possible ways. The chemical reactions of the substances produced varying colours which served to identify the combinations formed. Another experiment required the child to predict the conditions under which a rod would bend sufficiently to enable one end to touch the water in a basin. Weights and clamps were attached to the rods which varied in thickness, cross-sectional form, and substance. These variables had to be considered one at a time when determining the conditions under which the rod would bend. This meant that all the other variables had to be held constant. In other words, the child had to imagine all the possible combinations involving these variables. Given the sophisticated structure of these two tasks, it is not surprising that it was not till adolescence that children could do these tasks, that is, at Piaget's stage called 'formal operations'.

Young children can solve seriation problems

While acknowledging Piaget's outstanding contribution to child psychology, modern research is yielding a more positive and realistic account of the young child's cognitive abilities. For example, DeLoache, Sugarman, and Brown explored very young children's strategies in assembling a set of five nested cups. The cups were chosen because of their appeal to young children and because mistakes were immediately obvious to the children – a feedback feature. Children as young as 18 months arranged the cups with enthusiasm. They knew immediately when they had made a mistake and hence, were able to correct their errors. An analysis of the ways the children managed the corrections revealed increasing flexibility and broadening of thought and action with age, trends which otherwise might not have been detected.

Young children can reason deductively

It was once thought that only older children could manage to draw logical conclusions. However, six-year-olds have this ability. Within the context of a make-believe world, Dias and Harris presented young children with syllogisms whose premises ran counter to their practical knowledge, for example:

All cats bark.
Rex is a cat.
Does Rex bark? Why/why not?

It was found that the use of fantasy cut down the attention they gave to their practical world knowledge, enabling them to accept the premises as a basis for reasoning. Given a task with appropriate content, young children can reason deductively. I confirmed this in a similar project. I gave beginning school children syllogistic problems with fantasy creatures. One piece of reasoning was

Wobbles wear furry pyjamas to bed.
Animals that wear furry pyjamas love to eat grubs.
Morilla is a Wobble.
Does Morilla eat grubs? Why/why not?

This was presented in two different ways. In one set of problems, children played with a stuffed animal called 'Morilla'. In the other set of problems, children were asked to pretend that *they* were the creature. For example, 'Let's

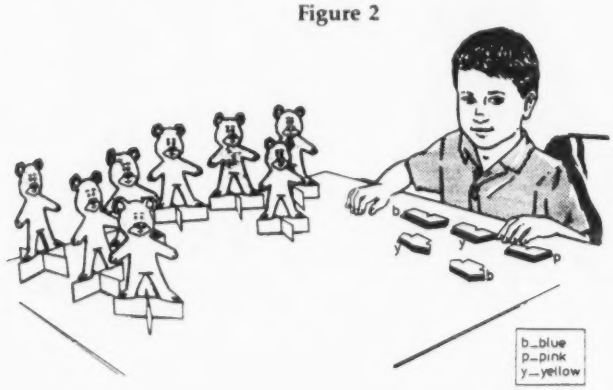
pretend that you are a Wobble. Do you eat grubs?' In this instance, one would expect the children to say, 'No! I don't eat grubs'. However, many of the children not only drew logically correct conclusions, but also gave 'theoretical' reasons why: 'Yes, Morilla eats grubs because she wears furry pyjamas', or 'Yes, I eat grubs because I'm a Wobble and I wear furry pyjamas.' In other words, the children did not guess; they were able to ignore practical considerations and use deductive reasoning to draw conclusions. An interesting finding here was that children who adopted the creature role outperformed those for whom a toy was provided. But maybe the doll's pyjamas were not furry enough!

Young children can solve problems of combination

Reasoning in a logical manner is also evident when children systematically form all possible combinations of two items. The name for the mathematical study of the selection and arrangement of items in a finite set is *combinatorics*. An interesting research project looked into how well young children can handle such problems. The problems they were given did not have 'ready-made' solution procedures and hence, the children had to use their existing knowledge structures and thinking processes to solve the problems. The study was in three parts involving 115 children aged from 4.6 years to 9.10 years. Here is one of the investigations in which 50 children took part.

Each child was presented with a series of seven problem-solving tasks involving dressing toy bears in all possible combinations of tops and pants of various colours. Two of the tasks used items of the same colour but with varying numbers of buttons. The number of possible combinations ranged from five to nine.

Figure 2



The children were videotaped and their problem-solving tactics later analysed. They all possessed a repertoire of problem-solving strategies which they almost all could apply effectively. All of the children commenced with trial-and-error; they did not employ any systematic method in selecting the clothing items but simply chose the tops and pants in a random fashion. This is a relatively inefficient way of solving such a problem yet 25 of the 50 children managed to get all the possible different outfits in the first task. The major reason for their success was their effective use of checking strategies. They employed a number of scanning actions to monitor their progress. Through careful scanning, the children were able to detect and correct any errors in the mix of items they had selected.

As the children got further through the set of similar tasks, 28 of the 50 children adopted more sophisticated solution strategies. They moved away from trial-and-error towards systematic solution procedures involving a pattern in item selection (e.g. *blue top, green top; blue top, green top*...). They refined their pattern until they had adopted an efficient 'odometer strategy', so named because of its resemblance to the functioning of a car's odometer (milage counter). This strategy involved taking one item of clothing (e.g. a yellow top) and systematically matching it with each of the items of the other type until all possible combinations with that item had been formed (e.g. *yellow top*/pink pants; *yellow top*/blue pants; *yellow top*/red pants). This procedure was repeated until all possible combinations of tops and pants had been formed, as shown in Figure 3.

Figure 3

While the problem (dressing dolls) was meaningful to young children, the mathematical domain underlying the task was new to them. Hence the children's initial attempts showed little knowledge of combinatorics, but considerable knowledge of informal problem-solving procedures. But once they had finished the tasks, many children displayed an implicit knowledge of combinatorial principles. Some could even make the principles explicit by explaining the 'best' way of solving the problem. Associated with this was a significant improvement in their ability to tackle non-routine problems outside the combinatorics field, with many children independently acquiring expert-like problem-solving strategies. In essence, these children were able to assume control of their own learning.

Conclusions

The findings of the studies have significant implications for the education of young school children. Traditionally, mathematical problem-solving in the early school years has focused on routine word problems involving arithmetic computations. Because problems of this type are usually 'predictable' in that they can be solved through the application of one of the four arithmetic operations, they rarely provide children with the opportunity to engage in diverse thinking processes. Problem-solving in the early school should encompass more than the application of previously learnt rules or procedures. Children need to engage in a wide range of problem-solving experiences (some of which have as many solutions as there are children in the class) and should be encouraged to *think* and *talk* about their means of solution. Schools should capitalise on young children's intellectual talents so that their thinking can be extended and enriched.

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Notes

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The study first mentioned was undertaken by Lyn English during 1989. Further information may be obtained from her.

The underestimation of children's competence as thinkers and problem solvers is detailed in

Donaldson, M. (1985) The mismatch between school and children's minds. In N. Entwistle (Ed.) *New Directions in educational psychology 1: Learning and teaching*, London: The Falmer Press.

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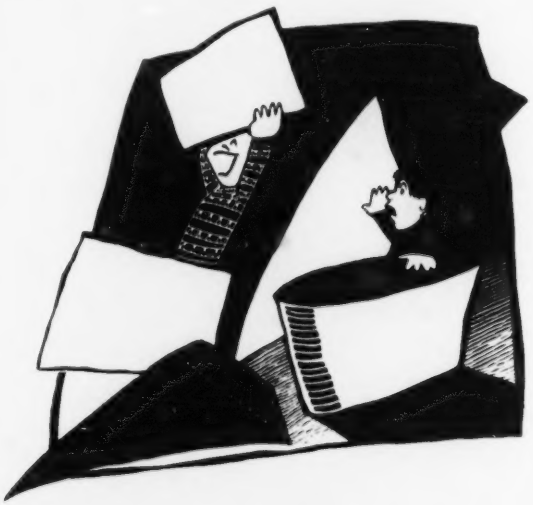

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INCREASING META-LEARNING

Part 2
Thinking Books

By **Susan Swan**
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THIS IS THE SECOND ARTICLE of a pair on methods of improving the quality of students' learning. The first, by Bakopanos and White, appeared in the previous issue of *set*. It described the encouragement of senior secondary school students to ask questions. The intervention described in the present article required middle primary school students to write, each day, one thing they had learned. In both cases the purpose was to make students more purposeful learners, more aware of how they learn. The technical term is meta-learning.

The procedure described here, like the one in the previous article, appears simple. Both, however, illustrate two key points: interventions to increase meta-learning cannot be brief, as they have to alter the ingrained learning habits of years, and for them to affect classroom behaviour they have to be part of the normal programme, not taught as separate lessons.

Study 2: Helping Children Reflect on Their Learning

In 1985 John Baird made the first Australian experiments in meta-learning, with 14- and 16-year-olds in science classes. He made much use of evaluation notebooks in which at the end of each lesson the students graded the quality of their involvement. A similar diary was introduced at the beginning of the Project for the Enhancement of Effective Learning (PEEL) at Laverton High School but soon had to be abandoned as the students disliked using it. That was unfortunate, since recording how well the student had thought about the topic of the lesson seems a useful way of encouraging meta-learning. It remains useful, however, only if it involves reflection and does not degenerate into a chore that is done mindlessly.

The potential value of written reflection on lessons remained attractive enough, despite the PEEL experience, for another investigation of its practicality. The students in this trial were much younger, a Year 3 (Std. 2) class of 21 children of average age about 8 years.

Entries in the diaries or evaluation notebooks in the earlier studies had been brief assessments by the students of their activity in the lesson. The entries were required for every lesson. With the younger children in the present study we preferred to limit the entries to one per day, and make them more complete and direct descriptions of what had been learned. Each child was given an exercise book on the first day of the 1988 school year, and was asked to label it 'Thinking Book'. Entries in these books were to be the means of training them to become more conscious, purposeful learners.

The training involved a cycle: the children reflected on their learning and wrote in their thinking books, the teacher then reflected on their entries and wrote a response in each book, then next day the child read the teacher's response and thought about it in making the next entry.

In constructing responses, the teacher had three major objectives in mind. The children were:

- to increase links between what they were learning and what they already knew;
- to increase links between what they were learning and their experiences outside school;
- to become more active in learning, through questioning things they did not understand, the purposes of classroom activities, and the effectiveness of their work habits.

An example of how the teacher promoted the first two of these objectives follows. All examples are headed by the child's name and the date.

Jenny, April 12th.

Have you ever used a grid for doing things like anything before? No I haven't but I think that you use a grid to play noughts and crosses. but I don't think I have used it for eney things

It took about 20 minutes each day for the teacher to respond to the children's entries. The responses were never negative. Errors in facts and in spelling and grammar were not corrected, since that would have inhibited the children. Errors were dealt with in class, without ascribing them to individuals.

The procedure began on the first day of the school year (February 3), and continued through the year. This report is based on progress up to the middle of the year.

Results

The data are the students' and teacher's entries in the thinking books. They are extensive (about 2000 student entries for the class in half a year), and virtually impossible to summarise in a table. A more substantial sampling of the entries than is possible here is in Susan Swan's thesis; here all that we provide are summary conclusions with one or two illustrative examples and one complete case study.

Objective 1: Increase linking with prior knowledge

The children increased markedly their formation of links with prior knowledge. At the beginning of the year none formed such links, and commented only on the new things they learned each lesson. The teacher's responses encouraged them, and they made progress in reporting links, in the thinking books and in oral work in class.

Stephanie, May 24th.

LIBERY

Today in Libery i lornt more about how people or people how do books A make their pitcers they use lots of diferent metterials they some-times knit there over pitchers.

That's right Stefanie. Have you ever made a collage before? Yes in art we did a collage of Sovren Hill of bleraf. Good thinking

They continued to find it difficult to recover prior knowledge, preferring to recall episodes of events. These episodes were relevant, but the children had trouble in extracting facts from them. One example occurred when the children were discussing feral animals in Australia. All of the children in the group claimed that they didn't know anything about feral animals but once the discussion got going almost every child was able to relate a story about foxes or some other sort of feral animal from an uncle's property or wherever. Most of the children did in fact possess quite a bit of knowledge about the topic but it seemed to be inextricably linked with particular episodes.

Nevertheless, the children became much more fluent in reporting links between topics.

Objective 2: Increase linking with out-of-school experiences

Linking with experiences cannot be separated sharply from linking with factual knowledge, as we found with the first objective. The children became very fluent in making links with episodes, although at the beginning of the year they made none. They had to be helped to make them.

They began to make links with their own past experiences, but even more excitingly came also to observe uses for what they learned in other people's lives and for themselves in the future. This was true for both further learning and in out-of-school applications.

Polly. April 13th.

In Maths I lerne horozontle Looks like this — vertical is this way I like on I.

Good Polly. I can see that you have already worked out a way to remember which is which. What use do you think this information may be? If you wont to make a hiding and and it is cooked how are people going to live in it? We dont want it like the leaning tara pesia. That's very good thinking Polly. I wonder if the person who built the leaning tower of Pisa used a plumb line.

Objective 3: Increase activity in learning through questions by students

The children were to question anything they did not understand, the purposes of classroom activities, and the effectiveness of their own work habits. This objective was achieved less well than the first two, though even here progress occurred. They did ask questions in their books, but not so much about the three targets I listed above; rather, they wanted information about something they were interested in, or wanted to know the teacher's opinion.

Jenny, March 3rd.

What questions do you have about our work on aborigines?

why did the wite people spole the abrignios life? and why did the wite men take all of Auctralia? Mrs Swan I feal sorry for the abrigrines. Is ther sumb way we can help?

There were very few *questions* about things the children didn't understand, the purposes of class activities and their work habits. This should not necessarily imply that they were not questioning at all. Most of the children were continually reflecting on these aspects of their learning but rarely posed those reflections as questions. They made a lot of *statements* in their thinking books to point out the things they did not understand in various lessons.

Catherine, April 13th.

Today in myths were horizo Lins and Verrict I am hiring the [redacted] two Lins So much that I am biging to getting confuosd. Look to the brush and it will rmind you.

By writing down the things they did not understand the children had a belief that this would mean they would receive some assistance, either through the responses they were given in their thinking book or through additional assistance in the following lesson. In this way their reflections on areas of difficulty had the same effect as questions. The children seemed to find it easier to write about something they were having difficulty with, rather than forming it into a specific question.

The purposes of classroom activities again were not so much questioned as reflected on. The children were encouraged to think and write about the purposes of things they were learning. At times when they could not see the purpose, they either stated this or posed it as a question.

Tim, April 11th.

Today in doble
rittin I didint ~~wir~~ now.
how to do doble ritting
why do we larne how
to do doble ritting?

Although framing questions was difficult, in general there seemed an understanding that there was a purpose to each classroom activity and the children had to think about and decide what this purpose was. They became very good at this type of reflection.

Jenny, April 22nd.

today we had spelling
and I lirent that if
you don't lirn how to spell
then when you write letters
people will not understand
you. and if you are a
secrtery then you will
need to know how to spell
other wise you will be
fierd ~~of~~ bang

The children used the thinking books very infrequently to reflect on their work habits. But they did occasionally, when making excuses for what they didn't do.

Ariana, March 9th.

Today I wanted to finish in time
but I didet because I was
to slow. What made you slow?
I was talking to much

At no time did they form these reflections into questions about their work habits.

When asked to reflect on what they have learnt by writing in their thinking books, most of the responses provided by the children reflected a good understanding of how they learnt and the role of the thinking book in their learning.

Jenny, May 27th.

Today Mrs swan asked us
to write in our thinking
books what we lirent by
doing our thinking books
and I lirent that you
give us our thinking
books because you think
that it is inportnt that
we do some thinking
in sted of lirning nothing
well, we do lirn some thing but we
just don't think of what we
lirn and you wont us
to think so that you
know what we lirn
and that arfter all
is a very inportnt
thing don't you thin
k Mrs swan I think
it is very inportent.

In conclusion, all of the objectives set out were achieved in some measure. The children's reflections in the three areas outlined did increase significantly in frequency, in quality and in their spontaneity. The form that those reflections took, however, was perhaps a little different to that which was anticipated in the planning of the strategy. The children relied heavily on linking their learning with actual episodes rather than facts. They did not use questions to clarify the things they were learning or to reflect on their work habits as was anticipated, but rather to find out more about the things that interested them or puzzled them.

A Case Study

Impressions of progress with the objectives are best gained by reading each child's thinking book from start to finish. Some, of course, change more than others. The child in the example that follows is one who at the beginning of Year 3 was already in difficulty in coping with school.

Stephanie arrived new into the school from a nearby school at the beginning of the year. She was enrolled by her older sister Maria. Maria is fifteen years Stephanie's senior and requested that any correspondence or problems concerning Stephanie be directed to herself rather than the parents as their English is limited. Both parents and Maria were born in Italy although Stephanie was born in Australia. She has no other brothers or sisters.

After questioning Stephanie about the family roles, it became evident that she did not take any responsibility for herself or her belongings at home. She did not have any jobs around the house which she was expected to perform. Her school bag was unpacked for her in the afternoon and packed again the next day. She was told

by her sister what to wear every day. All notices which were given to Stephanie to have signed by parents and be returned, such as Religious Education and Swimming permission slips, were returned to school by her sister.

A few days after the class's first homework project was given to the children, Maria arrived at school to find out exactly what the project entailed, as she claimed that Stephanie seemed confused and anxious about it. When the projects were handed in, Stephanie's was of an extremely high standard with very detailed illustrations and written in handwriting which definitely did not belong to her. When asked to present her project to the class, she could not even read what was written.

All of the children in the class work daily on process writing. This entails work on individual pieces of writing for which they are responsible. The role of the teacher during these sessions is that of a consultant, providing individuals or small groups of children with conferences about their writing. During the first couple of weeks of term, Stephanie would complain at the beginning of each session that she 'had nothing to write down.' She asked to work with a partner. This was allowed in the hope that it would motivate her or stimulate some ideas for her own writing. During the first four weeks of term she 'worked' with various partners but seemed to spend all her time talking about irrelevant topics. The only written work completed during this period was written solely by the other child.

Stephanie rarely made any contributions to class discussions early in the year. Occasionally she would raise her hand indicating that she had something to say and then ask a question quite irrelevant to the discussion. For example, during a discussion about the conditions on board the first fleet ships for convicts, she put her hand up to ask if the class had sport that day as she 'forgot her runners'. She tended to sit on the outside of the group of children and often played with another child's hair during such discussions.

Stephanie often seemed inattentive at the beginning of the year when instructions were being given. She never attempted anything without first requesting help. She continually complained that she did not understand or could not complete an activity, even before attempting it.

Stephanie's early reflections in her thinking book regarding what she had learnt revealed a lack of effort and responsibility toward her own learning. Her first three entries all commented that she had learnt something but had forgotten what.

February 4th.

What did you learn about the early settlers? / fogot

February 5th.

We saw a map and I lornt abot
What was it that you learnt Stefanie?
was I dont know why but I
fogot

Following this she began to write a minimal amount but it was unrelated to that which she had been directed to write about.

February 10th.

Yesterday I learnt at home how to do this thing that is Italian but I don't know how to say it in English.

After two weeks of writing daily in her thinking book, she wrote an entry which did in fact reflect on what she had learnt in relation to that which she had been directed to write about.

February 16th.

I have lorn abot the black people they were tyed under the boat. They were alad on deck for exesiaz

Even though this entry revealed confusion between convicts and aborigines, the response provided was positive as this was the first entry which showed some comprehension of the task.

The following day she then wrote almost the same thing again.

February 17th.

I did lornt abot the first fleet they were tyed under a boat the water was deep but I do not know how deep

The response she received back pointed out that this was almost a repeat of the previous day's entry.

About two weeks later, the entries began to show somewhat more detail and evidence of reflection.

March 1st.

A legen is something abrigens explan to tell you insten storys. I know two legens they are how the Brids got there colur and How the kangroow got his tail.

A couple of weeks after this, Stephanie began to make links between what she was learning and her experiences in the world. She also began asking questions and reflecting on her own work habits.

March 10th.

Today at maths we dont some sums. I learnt that maths you do have to learn. just incase when you grow bigger something happens with the bank and you have to add up at home sumtimes i practice somes because i play scool. I learn alot by doing sums.

All of the responses provided back to Stephanie were positive, encouraging her to continue to make these links and to question anything she was unsure about or found interesting. Stephanie's responses continued to show increasing evidence of reflective thinking and active linking.

March 24th.

Today in maths we lornt how to tell the time and so did I. At fist I was worreyed because I thort that I wuld never know how to tell the time but now I do now how to tell the time It is usful to no know hows to tell the time because when you grow up if you have a mealy for work you need to know how to tell the time. Or you can be late for scool if you dont know how to tell the time.

Stephanie's classroom behaviour began to change at about the same time that her thinking book reflections were changing. She began to attempt to complete her work before asking for assistance, and usually found that she could complete it without help.

Stephanie began to work on her own during process writing sessions after the fourth week of term. She began to produce some quite reasonable pieces of writing and no longer asked for topic ideas. Stephanie managed to organize conferences about her writing and before the end of term had made two of her stories into books.

Stephanie's participation in class discussions gradually increased during the later part of the term. She began to make some worthwhile contributions and ask some interesting questions such as: 'How did the white people learn to communicate with the aborigines?'

The second project which was to be completed at home was handed in at the end of first term. Stephanie's was written in her own handwriting this time and she presented it to the class quite confidently. The artwork was again of a very high standard and obviously not done by Stephanie. Her sister had not visited the school to find out what was expected for this project.

This change in attitude and behaviour could not necessarily be interpreted as a consequence of Stephanie's increasingly complex reflections in her thinking book. It certainly, however, played an important part in increasing her confidence in and sense of control over her own work as was evidenced by her sister's comments. Maria came to school to check up on Stephanie's progress saying that Stephanie had been telling her how much she had improved and how she was thinking so much harder. At the end of first term Stephanie asked to take her thinking book home to show Maria and parents how well she was doing and how she was a 'good thinker' now. Stephanie was asked if writing in her thinking book had helped with her learning. Her answer was a definite 'Yes'. When asked in what way it helped she said 'Well it makes me think about what I use things for when I grow up and that. It's good for you to think about what you're learning and to ask questions. I think they're really fun too.'

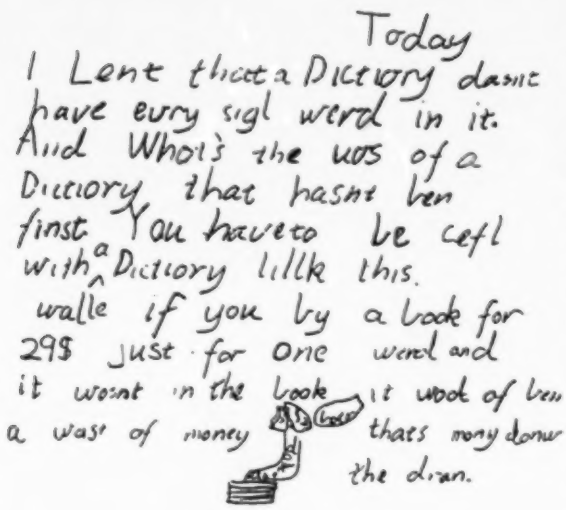
Although assessment of the thinking books has to be subjective, case studies such as Stephanie's give us confidence in the effectiveness of the books in improving the quality of the student's learning. That effectiveness is not, however, automatic. One prerequisite is that the children must distinguish between what they *did* in class and what they *learned*. For some children this took nearly a term, with frequent reminders and conferences with the teacher. This early example shows Vicky writing about what she did, not what she learned.

Vicky, February 12th.

We wear singing songs with MR Bollick techers and ather grades it is good fun singing songs.

Language skills need to be at a basic level. This was a problem in the study for a few students, whose first language is not English. Beyond the basic level, language skills do not seem as important in determining quality of reflection as does learning style. Anna, for instance, is a fluent writer who spells and reads well, but tends to write glib responses to lessons with a similar pattern of reflection every day. Other children with poorer language skills such as Catherine are capable of original reflections:

Catherine, March 24th.


Today
I Lent thiet a Dictiory dasnt
have every sigl werd in it.
And Whois the uos of a
Dictiory that hasnt ben
finst. You haveto be cefl
with a Dictiory lillk this.
walle if you by a book for
29$ just for one werd and
it wosnt in the book it wod of ben
a wast of money thats wny donw
the drain.

Final Comments

Despite the difficulties encountered in trying to increase the frequency of questioning in the first study, the impression we derived from the two studies is that it is possible to increase the quality of learning by training in meta-learning. That training must persist for a long time. Indeed it must pervade lessons; it is not a treatment that can be given for a while then turned off. It is a permanent and continuous approach to teaching.

The form of the training may vary. In one study we encouraged questioning, in the other, we encouraged written statements of learning. Both were practical, and could be sustained indefinitely. Many other methods of encouraging students to reflect on their learning can be expected to be equally effective.

Whatever the method, it has emerged that two factors that are powerful in determining success: (1) the personality of the child, and (2) his or her perception of the purpose of schooling. Together these factors influence learning style. Neither is easy to alter, being determined by forces beyond the teacher's control. The older the student, the more both are set.

That was the bad news. The good news is that practical and effective procedures (such as those tried in these two studies) are available.

Notes

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This work on Increasing Meta-learning is published in two parts, the first appearing in *set* No. 1, 1990, by Vickie Bakopanos and Richard White and called Increasing Meta-learning, Part 1, Encouraging Students to Ask Questions.

The research described in this item can be found in more detail in

Swan, S.M. (1988) *Helping children reflect on their learning*, Master of Educational Studies project, Monash University.

Further references to other research can be found in the notes section of the first article, *set* No. 1, 1990, item 1, Increasing Meta-learning. Part 1, Encouraging Students to Ask Questions.

For further reading on Metacognition and Meta-learning see

Biggs, John, 'Reflective Thinking and School Learning, An introduction to the theory and practice of *metacognition*' in *set* No. 2, 1987, item 10.

and

White, Richard T., (1988) 'Metacognition' in Keeves, J.P. (Ed.) *Educational Research, Methodology and Measurement: An International Handbook*. Oxford: Pergamon.

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FINDING YOUR FIRST JOB

From College to Classroom Under New Rules

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New Systems for Old

The way beginning teachers find jobs, or have jobs found for them, or are directed into jobs, are very different, country to country and state to state. In New Zealand, the educational administration revolution of the last 18 months has brought in a system at the 'market forces' end of the spectrum. As you leave your college of education you apply to whatever school you would like to teach in and the Principal (optionally advised by the parent-run Board of Trustees) decides whether you should get the job. Apart from the knowledge that the government is going to pay a fixed salary, the situation is very like that in the business world – you sell yourself, in competition with your friends.

1990 was the first year this system was used. What happened? What are the pitfalls? How did the students, now first-year teachers, find it? How did the principals find it? Would you recommend it to your best friend, your favourite education system, your local MP?

Our research

Two years ago beginning primary teachers were placed in schools by a regional board; every student was guaranteed a position and most appointments were confirmed by the mid-November before they began. The first round under the new procedures was carried out during October 1989. Therefore, in November, we asked 131 principals, who had advertised first-year positions in our area, for their reactions, and asked the 300 students, during their last weeks at college, for theirs. We got replies from 127 principals and 244 students, so we can have considerable confidence with the results. In a few cases questions were not clearly answered so we give the results here in percentages.

Two further points should be stressed. First, the survey and analysis which follows relates to the first round of job offers only. In this first round there were about 100 more students graduating than jobs advertised. An 'over-entitlement' scheme was introduced later and by February 1990 only 14 students were still unplaced. Secondly, the match between students and principals is close but not complete: students from outside Auckland did apply for jobs in the region.

Student sample

The final student sample characteristics were as in Table 1.

Table 1
Student sample characteristics (Percentages)

Sex	Female	87	Male	13		
Ethnicity	Maori	10	Pacific Islander	8	Pakeha/Other	81
Training	3-year	83	Pacific Islands Trained	6	Graduate	11
Age	<25yrs	65	25-35yrs	22	>35yrs	13

Results

The 224 Students

College preparation

Colleges of Education have a responsibility to prepare students for the appointment process. How well did the Auckland College of Education perform? The students were generally happy with the validity of the 'College Profile' prepared by the staff. Opinions were more mixed on the college's performance in preparing students for job applications and job interviews. Interview preparation in particular was considered inadequate by 40 percent, although almost as many gave a top rating as gave a bottom rating. Comments called for more assistance and support before and during the appointment process.

Applications and visits

As might be expected, most students (90 percent) applied for one or more jobs. About three-quarters of these applied for between four and 12 positions, but five applied for 25 or more, with two applying for 40! All who applied included a curriculum vitae and the college profile report; almost all provided a transcript of their college work, teaching experience reports and reports from their associate teachers. Just over a third offered the names of referees.

During the selection process, almost three-quarters visited at least one of the schools applied for, met with the principal and/or had one or more formal interviews. Half met informally with other staff of the school, a third met with the Chair of the Board of Trustees, but only eight students (4 percent) met with the full Board. An even smaller number (three students), gave a demonstration lesson.

These general figures do not reveal the extraordinary range of action taken by individual students. One student had 11 formal interviews, and 24 others had six or more. Two students visited 14 schools and, indeed, a quarter of those applying visited six or more. The picture in general is that some students spent an enormous amount of time in the process of applying for their first teaching position. Compounding the difficulty was the fact that the job search process coincided with their final teaching section (professional practice) in schools.

Interviews

Of key importance in the selection process was the formal interview. About 85 percent of students attended one, two, or three interviews. Common patterns emerged.

First, over 85 percent felt there was a good range of questions and that they had an opportunity to speak in a situation that was professional but pleasant and relaxed. This was a very positive result from the survey. On the other hand, some students reported finding the interview process very demanding:

> I felt very inadequate being asked questions like 'What else you can do for our school?' Sometimes I thought they were looking for a superman or superwoman.

The major areas about which they were questioned included their curriculum knowledge (90 percent), their interests (81 percent) and classroom management (74 percent). Students felt that schools sometimes had very high expectations in specialist curriculum areas:

> Schools are placing music and P.E. at the top of their required skills in some areas, and a beginning teacher cannot be expected to be highly qualified in these until more experience has been gained.

More than a third were asked questions about their teaching experience, Maori and multicultural experience, their personal philosophy of teaching, and their ability to relate to others. Just under a quarter were asked personal or family-related questions. While the large majority of this last group were women (34 of 39 involved), the same percentages of men and women interviewed were asked personal questions.

Based on questions asked at their interviews students were asked which factors influencing appointment they believed were most important. Factors noted by 50 or more students (about a third of those interviewed) were: multicultural experience, interests outside teaching, the reports of associate teachers, the college profile and transcript, their spoken English, their general appearance, and their age. None of these factors was mentioned by more than two-thirds of the students and little evidence for these beliefs was proffered. Only very minor differences were noted between males and females and the small number of men involved makes statistical comparisons inappropriate.

Offers of Positions

Seventeen students (8 percent) were offered positions before the official closing date. Almost two-thirds of these had been on teaching practice in the school concerned; of those offered positions after the legal date only one-third had taught in the school during teaching practice. Nearly half of the early offers were to Maori students.

In all, two-thirds (66 percent) were offered one or more positions. More than half of these were offered one position, but two students were each offered nine positions. One in five applicants, presumably perceived as the top contenders, were offered at least three positions. Many students offered comments about why they believed they were appointed. These show a wide range of factors thought to be critical:

> I hadn't done a section there, but I had taught music there and been on a music camp with them. I knew they were looking for a music person.
>
> Because of my age I looked like a member of the staff instead of a trainee. I came from the right community.
>
> Having been at the school on section... the school knew who I was, what I was like in the classroom as a teacher, and what my relationships with the staff and the children were like.
>
> Principal is pro-equity so my gender and race made me desirable.

The data were analysed to see whether such perceptions could be identified in the total group. Results from this analysis suggest that the schools operated individually and did not follow a clearly identifiable pattern.

1. *Equity.* Although the numbers are relatively small, some interesting trends may be noted. Males were more likely to receive offers than females (70 percent v. 65 percent). Among this group, pakeha (European) males were slightly less likely to be offered a position than non-pakeha males. Six of the 16 pakeha males who applied did not receive a first-round offer. Similarly, more than a third of the pakeha female applicants received no offers, but only one Maori female (of 14) was not offered at least one job. There were 13 Pacific Island Trained Teachers; they received fewer job offers on this first round, with over half receiving no offers at all. These people have nevertheless been placed in positions on subsequent rounds.

2. *Age and gender.* A trend which was clearly apparent related to age and gender. Nearly half the women aged over 36 received no offers: 38 percent of those aged 25-35 found themselves in that situation, but only 30 percent of those aged under 25. While a similar trend was observed for men, the numbers here were very small. Along with this, students who were parents (one in five of those applying), were less likely to be offered jobs; 39 percent did not win a first-round offer, as opposed to 32 percent of those without children. It is unclear as to whether the combination of age and children was the major factor for these people in this first round of offers, or whether other factors were also critical.

3. *Qualifications and Training.* The qualifications of the students, or whether they had completed three-year or two-year (graduate) courses, appear to have made very little difference to the proportion offered positions. Indeed, holding university qualifications does not appear to have made any difference, with any slight trend favouring those *without* university papers or degrees. One or two principals commented directly on this aspect in the questionnaires:

> Having a university degree doesn't mean that they will be a good teacher.

4. *Prior Association* ('Being Known'). A factor that does seem to have been important was whether the student was known by the school. This was usually because of teaching practice, but some students had assisted their local schools in other ways, or were known because they were part of the school community. Although the survey did not allow a precise figure to be placed on the link between prior contact and appointment, the results and comments make it clear that being known gave an advantage. While this is hardly surprising, it does mean that other, possibly better, candidates may have been overlooked. One student felt very strongly about this (and the whole process):

> Welcome to the real world. Appointments were made before the closing date of applications. Principals went for who they knew.

Overall, a complex interaction of factors seems to have affected the appointment process, but many students strongly suspected that individual appointments were made on the basis of one or two highly desired criteria.

Student Perceptions of the Process

Many students offered comments about various aspects of the appointment process. Some of these reveal a quite different dimension from that given in the general summary of events above. Indeed, negative comments far outweighed positive ones, particularly those telling how students felt personally about their experience.

It is clear that some schools were inundated with applications, with several schools receiving more than 30 applications for one position. In such cases schools did not have adequate time to process these applications adequately. The following selection of comments shows the kinds of treatment some students received as a result:

I am disappointed at the way some schools didn't even look at some applications. Shortlisting was done before all applications were in.

I was really angry at the fact that 5 schools failed to notify me or even acknowledge that they had received my application. In the end I rang the schools to find out that someone else had the job.

Some were very late in sending rejections. One just crossed *their* name off the [application] envelope, put *mine* on, and sent it back.

On the other hand, students were very appreciative of schools who treated them courteously:

All my transcripts came back by post. Some of them wrote nice notes.

The process itself was clearly alienating for many students, they felt unclear about what was expected, and what individual schools were looking for.

It felt like a meat market out there. There were vast differences between schools and their expectations.

It was like a lottery. The principals had different expectations and no set procedures. I feel very remote and alienated.

Strong criticism was levelled at some principals by students. Far more negative comments were expressed here than positive. Principals were perceived as being the key figures, with mixed feelings about Board of Trustees involvement in the process.

Board reps didn't really know what they were asking for. Abundantly clear, principals held *all* the power.

Totally unfair. There are no rules. Boards of Trustees and principals are all doing what *they* want to. I feel bitter, angry, tired.

Once schools had decided upon their first choice, students were contacted and offered a position. Officially, students were permitted 48 hours to decide whether to accept the offer or not. In practice, a number of students reported that they were pressured to decide immediately.

Some schools put pressure on us to accept straight away or forget it. That wasn't fair.

I was rushed to make a decision between schools. It took me a long time to decide and badgering principals didn't help.

This pressure resulted in some students accepting jobs offered to them when they would have preferred to wait to see if a more favoured choice came up. This also worked against the schools, as students sometimes accepted jobs with considerable ambivalence.

I'm very happy that I have a position, but at this stage feel very insecure and worried because I (a) don't fulfil tags; (b) have no experience at this level; and (c) feel and know I was forced to accept this level because of my gender i.e., the male appointed at the school was automatically given the senior position.

One student experienced a very different kind of pressure, which resulted in losing another position.

I had one principal who asked me not to accept any other teaching positions before hearing from her and the final outcome was that I was fobbed off by her until I went in personally and was told I was unsuccessful.

Those who failed to win positions on this first round commonly reported feelings of failure and incompetence, as shown by the following:

To put it bluntly, my self-esteem has never been so low.

I felt like a right royal reject.

Even successful candidates reported that there was an unpleasant atmosphere at college following the initial round:

The level of bitterness is very high, and justifiably so I think.

Such remarks are not surprising, given that most of these students entered college believing that they would all be placed by the regional Board under the system operating at the time. Nevertheless, the overall pattern of student comment in this survey shows that the appointment process, as it operated, had some serious flaws.

Students' concluding remarks

All in all, the process of winning a position on the first round was clearly a time-consuming and stressful process for students. Many had negative experiences which left them upset or angry, whether they won positions or not.

Of those appointed, no single 'ideal appointee' emerges, although Maori males and younger females without children appear to have been relatively favoured. Qualifications make no apparent difference and being known by teaching practice or other contact, while helpful, was not decisive.

The 127 Principals

Positions available

The Principal's questionnaires identified 158 beginning teacher positions in their schools for the first appointment round. The majority of schools (80 percent) were seeking only one beginning teacher. Almost two-thirds of the positions available were in the junior school. Intermediate schools (11- and 12-year-olds only) offered 20 percent of the positions and often had more than one available.

Who selected beginning teachers?

The selection process involves both shortlisting and interviewing, as well as the final choice. Only 12 percent of principals reported doing the shortlisting on their own. Over half involved other teachers and a quarter used the expertise of both staff and members of the Board of Trustees (BoT). In 10 percent of schools, the principal and BoT members alone drew up the shortlist of applicants.

When it came to final selection, just under a third of the principals made this decision on their own. About the same number involved members of their staff, with the rest involving BoT members. It is important to note that in just over a third of the schools in the sample there was BoT involvement in both shortlisting and final selection. Under the new legislation principals have the authority to appoint basic scale teachers without any BoT involvement at all.

The Selection Process

The data make it clear that many principals put a great deal of time and effort into the appointment process, a point some students found contrary to their own experience. Nearly three-quarters of the principals held formal interviews for prospective appointments. The number of students interviewed ranged from just one to a surprising thirteen, with the interviewing of three or four applicants being most common.

As noted earlier, students supplied quite extensive documentation, many included referee's statements, college transcripts, profiles written by their college tutors, CVs and reports written by associate teachers and visiting lecturers. Which of these did principals find most useful? Many principals (60 percent) rated the CV as the most useful document. Comments such as, 'They gave excellent grounds for selection', and 'provided insights into interests and suitability', were typical. Principals commented on the 'high standard of presentation' of many CVs, though several questioned the need for 'glossy' or 'costly and professionally produced' documents.

College profiles were also considered to be very useful, particularly for initial shortlisting. However many principals felt that the profiles tended to be 'very similar'; some felt they were 'too general' or 'too positive' to help them discriminate among applicants. The profiles were con-

sidered to sometimes have a negative effect, 'damming [sic] the applicant if weaknesses as well as strengths were revealed.' These comments highlight the difficulty of preparing personal profiles which show achievements and strengths for a market that is essentially competitive, and where the first task for the principal may well be to *eliminate*, rather than to select candidates.

Most students supplied referees' statements or names of people to consult. A sizeable number of principals (40 percent) reported they did not use this information. They commented that they 'preferred to use their own judgement', and that 'personal interviews are much better'. Where principals did use referee information, it was 'to check where there was doubt', or 'to confirm information'. In some cases, this checking appears to be excessive. One student (a parent), reported that

> My children's principal was rung about me to find out about the stability of my family life.

While the last concern might not be preventable, these data do suggest that students should be more selective about documents supporting their applications, and that they clearly need training in writing good CVs and careful preparation for interviews.

What Factors Influenced Final Selection?

When it came to final selection, principals rated the following factors as 'very important':

commitment to teaching	80%
fitting the job description	73%
specific strengths in curriculum areas (especially music and multicultural strengths)	70%

Although principals indicated that personal factors such as age, gender, ethnicity and family circumstances were not important, 60 percent of them rated spoken English and the 'personality' of the candidate as very important considerations. Respondents were quite evenly divided on the importance of being able to speak Maori or another language, and on the holding of a university degree or part of a degree. This last point is intriguing, given that the Auckland College of Education has recently embarked on a bachelor of education degree with the University of Auckland.

There were also strong indications that principals were looking for a teacher who would fit in with existing staff and the local community. They commented on the importance of qualities such as being 'able to fit into a syndicate and plan co-operatively', and 'able to modify ideas and methods to fit the needs of the school'. Country principals were interested in the ability of appointees to 'adapt to a small town' and to 'live in a small community'. Some principals were, however, looking for people who would add to or complement their existing establishment. For example: 'Most of my staff are over 40, I'm looking for balance'; or 'I'm looking for a male as the staff are all female'.

The principals had widely differing general interests and used quite different selection criteria. It may well be useful for schools to consider making available a much more detailed job description/specification than was possible previously. Such descriptions will need careful monitoring however, to ensure that equity is safeguarded. Who would be involved in this is as yet unclear.

Discussion

The appointment of beginning teachers in 1989 was the first time that New Zealand primary schools had full and direct responsibility for appointing such staff. Appointment guidelines were issued to schools, but formal training in appointment and interview procedures appears to have been inadequate or non-existent. How successful, then, was the Auckland district experience?

If the major criterion for success is that each school appointed the person they wanted, then the process could be judged quite successful. Over 70 percent of principals appointed their first choice and a further 16 percent their second choice. In other areas, however, the data reveal some serious concerns.

The major issue for principals was their perception that a significant number of their colleagues 'jumped the gun', and appointed before the closing date. There was a strong push in comments for procedures to be more tightly controlled. A number made comments like the following:

> There should be closely defined procedures for advertising jobs, interviewing and notifying applicants.

Several remarked that 'all principals should abide by the rules'. One in four principals expressed concern that guidelines promoting fairness to all candidates had not been followed.

As has been noted earlier, principals' actions sometimes impacted strongly on individual students. At a time when both schools and students were struggling to adapt to new roles, it tended to be the students who were the main victims of hasty or unethical procedures.

The implications from the 1989 survey may be summed up as follows:

1. There needs to be enough time allocated to the appointment round to enable schools to process applications appropriately.
2. Guidelines on procedures need to be clear and explicit, and followed by all parties. Ethical standards must be high.
3. Students need to be informed of and supported in appeal procedures where these become necessary because of incorrect or unethical practices.
4. It is in the interests of both students and schools that the needs of individual schools be made as specific as possible, within equity provisions, so that time is not wasted through totally inappropriate applications.
5. Schools should be aware of the large amounts of time spent by students on what is often a stressful experience: they need to ensure that all applicants are treated with the courtesy and respect to which they are clearly entitled.

The final comment can best be left to one of the applicants. The message, echoed by the researchers, is quite simple:

> After what we've been through I hope things will be better when future students apply for jobs.

Notes

Marie Cameron is an educational psychologist and lecturer. Lexie Grudnoff is senior lecturer and co-ordinator, and Marilyn Gwilliam is a senior lecturer in the Education Department at the Auckland College of Education. Dr Roger Peddie is a senior lecturer in Education at the University of Auckland.

Full details of these surveys are available from Lexie Grudnoff, Education Department, Auckland College of Education, Private Bag, Symonds Street Post Office, Auckland.

The research team wish to thank the Principal of A.C.E. for both encouraging the group and making funds available to carry out this study. Thanks are also due to Tony Hunt, Helen Hoggard and Kittina Cowie for their work in processing the data.

Similar questions and a close examination of interview procedures are dealt with in an earlier set item recounting British experiences:

Adey, Ken (1989) 'A' for Accept; 'R' for Reject. The alphabet for selecting and promoting teachers, ***set***, No. 2, 1989, Item 2.

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set research information for teachers
number two 1990

Weather and Wickedness

Bill Badger and **Eric O'Hare**
University of Lancaster

Introduction

THERE IS ALWAYS TROUBLE when lunch is inside on wet days, when there is snow in the playground, and on any windy day. That is part of teacher folklore. But is there any statistical relationship between the incidence of disruptive behaviour and weather conditions? Is pupil behaviour really worse on windy days? Are there any effects of particularly cold, particularly hot or particularly changeable days? In the course of a case study of a mixed comprehensive school (roll 1217) in West Cumbria we were able to examine patterns of disruptive behaviour and to test the teacher folklore maxim that pupil behaviour is linked to the weather.

Although climatic effects on human behaviour have been looked at no-one so far has examined what happens in school. One area that has been carefully researched is that of the link between weather conditions and road traffic accidents. While concentrating largely on physical road conditions, Smith in reviewing previous work concludes that 'there is evidence that physical considerations alone are insufficient' to explain all accidents. Smith describes sharp rises in accident rates which have been associated with drivers' experience of rapid pressure changes linked with the passage of fronts. In turn these effects are seen as causing 'biologically unfavourable stresses operating on the central nervous system'. Miller looked particularly at the Santa Ana winds of the USA. With the general acceptance that hot, dry, windy conditions are linked with short-temperedness and a rise in domestic incidents, he points to significant relationship between the Santa Ana wind conditions and the rise in the crime rate. There is, therefore, some understanding of the effects of weather conditions, particularly of *changes* in conditions, on human behaviour.

Data Collection

(a) The Behavioural Incidents

The school has used, for the past few years, a quiet room, to which pupils involved in behavioural incidents with staff have been referred. Corporal punishment has never been used, and much of the disciplinary emphasis has been based on confrontational avoidance. Whenever a pupil or pupils are involved in an incident with a member of staff which might conceivably lead to a significant confrontation, referral is made to the quiet room in order to 'defuse' the situation. All such referrals are recorded, and dated, in order to help subsequent pastoral follow-up.

The Quiet Room book has been used in this aspect of the study to record the frequency of occurrence of confrontational incidents over the academic year September 1983 to July 1984. In all, the number of incidents recorded over 186 school days has been analysed. The 'number of incidents' simply refers to the number of referrals to the quiet room. In this paper, the number is not examined further with respect to, for example, how many different pupils were involved, or how many teachers. Nor do we examine what kind of teachers, male, female, experienced or newly qualified, referred the pupils to the quiet room. These data are available and have been analysed elsewhere.

(b) The Meteorological Data

Measurements of weather factors have been obtained for each day of this same period from an HM Coastguard station approximately 4½ miles from the school. The factors for which data were available for this period were:

Wind direction (degrees)	all as at 12.00 hours GMT
Wind speed (knots)	
Dew point	
Maximum temperature (°C)	between 9.00 hours and 21.00 hours
Minimum temperature (°C)	
Rainfall (mm)	

Results

Numbers of referrals to the quiet room averaged 26.4 per week, with a maximum figure of 18 incidents in one day and only nine days in the year when no pupils were referred.

The relationship between the behavioural referrals and each of the weather variables is analysed first by Pearson correlation coefficients. Correlation coefficients between number of behavioural referrals to the quiet room, and various meteorological data, were as follows:

With wind speed	−0.17
With dew point	−0.20
With max. temperature	−0.34,
With min. temperature	−0.31,
With rainfall	−0.10

All these correlations, except that with rainfall, were highly significant statistically, that is, they are most unlikely to be chance effect.

Wind direction (in degrees) presents its own fairly obvious problems, and cannot be included in a correlation analysis.

The correlation analysis indicated statistically significant relationships between the number of disruptive incidents and temperature measures in general and also to a lesser degree in wind speed. This level of statistical significance was not reached in the correlations between disruptive incidents and rainfall.

The data were subjected to regression analysis which can only be descriptive. It is summarised in Table 1. One of the interesting features not shown in the table is that it was not so much the average temperature on any day

that was predictive of disruptive incidents, rather the *range* of temperatures between the maximum and minimum values. The size of the difference between the maximum and minimum temperature values was directly related to the number of disruptive pupil referrals. For example, a temperature range from a minimum of 0°C to a maximum of 10°C. could produce an average temperature of 5°C. Equally well, a minimum temperature of 4°C to a maximum of 6°C could also produce an average temperature of 5°C. The prediction equation, however, gives more disruptive incidents on days showing the 0-10°C range than in the weather conditions that produce the smaller range 4-6°C.

The table shows that the minimum temperature was the most influential amongst these weather variables. This suggests that if, perhaps, the children were allowed to wear outdoor coats in the classrooms on days that were particularly cold, or if the heating was turned up, confrontations between teachers and pupils would be fewer.

Table I

Regression analysis (multiple regression = 0.46; R^2 = 0.21; standard error = 3.08 (Nie et al., 1975)

Independent variable in order	B	Standard error	*t*-values
Minimum temperature	-0.082	0.018	-4.6
Maximum temperature	0.029	0.016	1.8
Wind speed	-0.080	0.035	-3.4
Dew point	0.030	0.014	2.2
Rainfall	-0.003	0.003	-0.92

Constant = 7.21

The analysis produces the following prediction equation:

The predicted number of disruptive incidents, N =
− 0.08 x min. temp. + 0.03 x max. temp.
− 0.08 x wind speed + 0.03 x dew point
− 0.03 x rainfall + 6.

With this equation we could predict the possible number of disruptive incidents for a given combination of weather data. On average, the number of actual disruptive incidents scores may deviate from the predicted scores by about 3.

Weather variables feature in the regression analysis with varying degrees of statistical and educational significance. From the present analysis it appears that the *speed* of the wind was *negatively* linked, albeit slightly, with disruptive behaviour in the school under study. This does not bear out the widely held view that higher winds are connected with pupil misbehaviour. Rainfall does not appear here to be significantly related to numbers of disruptive incidents.

There *does* appear to be a connection between pupil behaviour and changes in temperature over the course of the day. Although lower temperatures overall are the most influential among the individual weather variables studied, the *range* in temperatures over a day is itself a more powerful predictor of numbers of disruptive incidents.

The current wide concern over disruptive behaviour in schools focusses on

the school itself in all its practices;
internal relationships and overall ethos;
effects of pupil background and community influence.

Effects of weather may be as powerful. They may also have different effects on pupils from the ones they have on teachers. The present paper puts into perspective the additional and variable effects of weather conditions on a day-to-day basis which may be superimposed on the likely occurrence of disruptive behaviour.

Notes

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They thank John Reay and the sixth form students of the West Cumbrian school for help in tabulating the meteorological data. Thanks are also due to Dr Nick Longford, Centre for Applied Statistics, University of Lancaster, for his help with statistical analysis.

Correspondence to Dr O'Hare, please.

For a fuller report of this research see
Badger, Bill and O'Hare, Eric. Disruptive Behaviour and Weather Patterns in a West Cumbria Secondary School, *British Education Research Journal*, Vol. 15, No. 1, 1989, pp. 89-94.

The research on the weather and human behaviour is more extensive than that mentioned briefly here. However, some of the research is
Weather and road accidents
Smith, K. (1982) How seasonal and weather conditions influence road accidents in Glasgow, *Scottish Geographical Magazine*, Vol. 98, pp. 103-114.

The Santa Ana wind
Miller, W.H. (1968) Santa Ana winds and crime, *Professional Geographer*, Vol. 20, pp. 23-27.

Weather and school attendance
Karweil, N.L. (1973) *Rainy Days and Mondays*, Report No. 162, Baltimore, Md.: John Hopkins University, Center for the Study of the Sociological Organisation of Schools.

Rapid pressure changes and 'biologically unfavourable stresses'
Horvath, L.G. (1970) Der Einfluss von Wetterveranderungen auf das Unfallgeschelen, *Zeitschrift fur Verkehrssicherheit*, Vol. 73, No. 1, pp. 85-87.

and

Roer, P.O. (1974) Effects of some non-transportation factors on the incidence and severity of traffic accidents, *Logis Transportation Review*, Vol. 10, pp. 165-179.

The data on the number of different pupils referred to the quiet room, and the teachers who referred them is in
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The regression analysis (see Table I) follows
Nie, et al. (1975) *SPSS*, 2nd ed., London: McGraw-Hill.

For further reading on disruptive behaviour

Whole school factors such as school climate and internal organisation
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and

Rutter, M. et al. (1979) *Fifteen Thousand Hours*, London: Open Books.

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Galloway, D. et al.)1982) *Schools and Disruptive Pupils*, London: Longmans.

and

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School size
Heal, K.H. (1978) Misbehaviour amongst school children – the role of the school, *Policy and Politics*, Vol. 6, pp. 321-332.

Classroom Management
Bennett, S.N. (1976) *Teaching Styles and Pupil Progress*, London: Open Books.

and

Wragg, T. (1980) Training teachers in class management. In G. Upton and A. Gobell (eds.) *Behaviour Problems in the Comprehensive School*, University College Cardiff.

and

Clarke, D. et al. (1981) Disruptive incidents in secondary school classrooms a sequence analysis approach, *Oxford Review of Education*, vol. 7, pp. 111-117.

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LESSONS *from* Mrs A and Mrs P

Helping Children Understand the Formal Symbolic Language of Arithmetic

By **Philippa Lane**
University of Canterbury

Introduction

MOST CHILDREN enter school able to analyse number problems and apply good problem-solving strategies, strategies that they have developed themselves. They understand the fundamentals of addition and subtraction and can apply their knowledge in both concrete and hypothetical situations. However, when introduced to formal written arithmetic many experience serious difficulties. It is suggested that there is a 'gap' between the symbolic system of arithmetic and the children's informally-learned methods and concepts. The direct-modelling methods the children naturally employ bear a strong resemblance to the actual situations they represent; the symbolic system introduced at school is far more abstract. For example, children often use their fingers to represent addition and subtraction problems, but at school they must learn to write equations using numbers and signs that seem to contribute little to problem-solving. Despite all the inherent difficulties it is important that children gain access to the power inherent in abstract mathematical symbolism.

Teachers make a difference to children's learning; there are many, many research results pointing to that. This was underlined in recent mathematics research with seven-year-old children which showed that class-mates at a particular school all had the same strengths and weaknesses. In some schools, pupils were good at subtraction; in other schools, the children were better at addition, and so on. In particular they understood equations according to the class they were in, not according to their general numerical ability. So it seems pretty clear that understanding mathematics concepts, such as equations, depends on the teacher. This idea was followed up in careful observations of what two teachers did and the results they got.

The Research

The Children and their Teachers

TWO Christchurch state primary schools (called here Austin and Potter) have pupils from middle socio-economic status families. Seventeen 6- and 7-year-old children were receiving their initial formal instruction in equations when I began the research. They were the children in the 'middle' maths groups in each class.

Their teachers, Mrs A at Austin, Mrs P at Potter, are both trained teachers. They have both been teaching for over 15 years and have attended courses on the teaching of new maths.

Mrs A 'really liked' new maths, enjoyed 'working with the aesthetic side of it' and didn't see it as 'just based on computation'. Mrs P felt that she understood the concepts involved, but had little confidence in her ability to communicate them; she preferred other types of teaching.

Starting Points

Each child, alone, was given a set of tasks to test general numerical ability: knowledge of rote counting, number sequence forwards and backwards, numeral recognition and counting by fives, tens and backwards from twenty. The average score gained by each school group was similar. I also checked what the children could manage with equipment and symbols already. First I used blocks, and asked, 'If we put 6 blocks here and 3 blocks here how many blocks have we got altogether?' Following a reply the child was asked to use magnetic numerals and signs to show 'that first we had 6 blocks and then we added 3 more.' This type of task was repeated with 9 and 5, 9 take away 3, and 13 take away 6. This can be called a *representation* task.

Working in the opposite direction I asked the children to read a set of equations and to demonstrate each using the blocks. This can be called an *interpretation* task. Marks were given for reading correctly, and for a dynamic explanation, actual or described. Dynamic explanations included removing the sets for subtraction or counting across sets or uniting them to demonstrate the joining principle of addition. The marks were higher for each type of task at Potter than at Austin school (see Table 1).

Table 1

Pre-test Scores

School	General			Equations		
	Range	Mean	S.D.	Range	Mean	S.D.
Austin	12-26	21.7	4.53	4-25	10.3	7.05
Potter	17-29	21.9	4.7	8-19	14.6	3.39

Ending Points

After the lessons had been taught I tested the children with the same tasks again. Austin school now outperformed Potter school. This was true for all the equation tasks considered together, and for each separate task except using magnetic symbols to represent the addition of blocks.

Table 2

Changes in the Understanding of Equations

School	Average gain/child	Total gain scores	Possible average gain/child
Austin			
All areas	36	4.0	7.2
Addition: Representation	4	0.4	1.8
Addition: Interpretation	10	1.1	1.4
Subtraction: Representation	7	0.8	1.9
Subtraction: Interpretation	15	1.7	2.1
Potter			
All areas	6	0.8	4.4
Addition: Representation	4	0.5	1.7
Addition: Interpretation	–1	–0.1	0.5
Subtraction: Representation	3	0.4	1.6
Subtraction: Interpretation	0	0.0	0.6

The Learning Opportunities

During a few days of instruction the Austin school children came from behind and overtook the Potter school children in their level of understanding of equations. What different learning opportunities did they get? What might help to explain their different progress?

Time

Both teachers devoted a similar amount of time to mathematics and concentrated almost exclusively on representation, working from concrete examples to symbols. Mrs A spent more time on subtraction (four times as much) and a little less than Mrs P on addition. This extra time was available because, in contrast to the Potter school lessons, very little time was spent in Mrs A's class waiting for children to get ready or teaching general things such as numeral writing. Differences in time spent on addition and subtraction are reflected in the amount learnt.

Class Organisation

The higher achieving group, at Austin school, spent more time in group rather than whole class instruction, had less teacher contact time and spent a greater proportion of group instruction time practising independently rather than in unison with the teacher.

Individual Attention

The most frequent types of attention given at both schools were for assessment and instruction. More individual attention was given at Potter school.

Instructional Style

A way of looking at the different ways the two teachers taught would be to ask where the main emphasis was placed. Was the emphasis on communication of meaning and understanding or on the teaching of isolated skills? When I looked at when the arithmetical rules were taught it was clear that the teacher who was working for meaning and understanding taught rules last of all, but the teacher busy with teaching skills taught the rules first.

Using such differences a chart showing different styles of teaching can be drawn up like this.

	Meaning	Skills
When the rules were taught	Last	First
What was taught about the Rules	Why used	How to use
Interest in child-constructed algorithms	Yes	No
Use of rote learning	No	Yes
Reaction to errors	Diagnosis	Judgement

A good example of different styles I have observed is in the way the equals sign is introduced, given meaning, and practised. Those teachers who emphasise skills convey the idea (1) that the equals sign is a signal to do something or, (2) it is a separator of problem and answer (thus suggesting a one-directional relationship between the two sides of the equation). Those teachers who emphasise meaning present the equals sign as a symbol of sameness, a bridge between the two sides of the question (thus suggesting a two-directional relationship).

Many of the characteristics of the two styles were evident during the first lesson of the unit. Mrs A had laid the ground-work in the previous week's lessons by having the class join and separate sets and describe verbally what they had done. This lesson began in the same way, but the 'number story' was written on the board. The symbols for 'and' and 'makes' were then introduced and the children given the chance to make up new examples and represent them with equations. Mrs A checked before the end of the lesson that everyone was able to represent the process they had performed and understood what they were doing. Then they were given two worksheets, one for addition and one for subtraction. These depicted the processes with everyday objects such as balloons, goldfish and birthday candles.

Mrs P began by putting magnetic triangles on the board, three of one colour and two of another, and writing '3', '2' and '5' below. The 'special signs' were immediately inserted, and she said, and repeated, 'three plus two equals five', pointing to the appropriate symbols. Following a brief mention of the meaning of 'plus' and 'equals', the children were asked to 'choose two colours and make a row of five', immediately proceeding to represent their examples in the form of a written equation. Group tuition finished with a short explanation of the word 'equation', and children were told how to complete a worksheet featuring stamped zoo animals.

Other differences in style became apparent as the teaching of the unit progressed. Both teachers taught their pupils how to represent processes symbolically, but only Mrs A explained why equations are useful: 'Just numbers doesn't show people what you have done – you need to do something here (points to signs) to show that we had a set of three here and a set of two, and that we joined them together to make five.'

The children at Potter school were required to adhere to a particular way of doing things. Mrs P liked the children to place the numerals and signs correctly on graphed paper, to date their work and use pages in order. They were encouraged to read the equations together, pointing to addends and circling the sum. Sometimes they chanted in unison a little 'rhyme': 'Adding works on two numbers, and you can put them in any order.'

Mrs A showed a relative lack of concern with rules. She encouraged the children to demonstrate things in their own way, guiding them to a particular method only if she saw the necessity. For example, when mistakes were made in the sum, the children were told to count the objects if they were unsure how many they had. The evaluation exercise at the end of the unit required the children to create a drawing or model to show addition and subtraction. Those who were unsure what to do were given a variety of examples. One child, who was in tears because she didn't know what to do was told, 'Don't worry, there's no right and wrong.'

For each teacher her way of reacting to errors was also part of her instructional style. Mrs P generally indicated what was wrong and told the child how to correct it, or just requested that it be done again. Mrs A showed more concern with why the child had erred. The two types of reaction were exhibited in similar incidents which took place in the two classrooms. In each case a child had written '=7' rather than the whole equation.

Mrs P: Don't do that, please. I don't ever want to see you do that. Write a whole equation and make sure it makes sense while you write it. Make it mean something.

Mrs A: You've just given me the end of the equation. You're telling me how many you've got. I want the whole equation. [Asks another child to give the whole equation, which he does.] Now, did you hear what he said? Can you tell me what he said? [She does.] Can you see how that's different from what you said? You just told me the end bit, but the whole equation's very important. [Mrs A gives her another example and asks for the equation, which the child gives correctly.] Great. I just wanted to make sure you understood that.

It should be noted that the two instructional styles are not claimed to be discrete, but to indicate an emphasis on a particular approach.

Mrs A conveyed two meanings for 'equals': 'makes' and 'the same as', but emphasised the latter, using the idea of scales as a model. A worksheet and a game reinforced the concept. Mrs P spent little time on meanings, but her explanation of 'equals' was the meaning-centred idea of equal sides rather than the one-directional 'makes'.

Teacher Clarity

The two teachers differed on a number of aspects:

Assessment and Individual Help. Both teachers scored well in giving help but only Mrs A assessed and gave help with *concepts*.

Explicit Establishment of Connections and Emphasis on Difficult Points. Only Mrs A made clear associations between ideas and tasks. She stressed parts of the work that she perceived as potentially difficult for the children to grasp. For example, during one lesson on subtraction she stood seven children in a hoop and then took five of them out.

> Let me show you what some of you people wrote for that [writes '5−2=7']. When you had your sets separated you could see your set of five and you could see your set of two. You forgot that in subtraction we start off with what you have at the beginning, then we look at what you take away, then you see what you've got left. How should that equation start off? [A child says 'Seven minus two equals five.' Mrs A writes it on the board and points to each numeral in turn.] This is what we started off with, that's what we took away, that's what we had left. [Two more examples were worked in this fashion.]

Mrs P was less explicit. She did not stress difficult points and checked less often that the desired connections had been made. For example, to illustrate the commutative property of addition the children were required to put a set inside each of two rings on a card, write the equation for it, turn the card 180 degrees and write the equation for the sets in the new position. The children were not told that turning the card was merely a quick way of re-ordering the sets. If they did not realise this and focused on the card-turning itself, then the concept remained unlearned.

Review and Organisation. Mrs P spent little time reviewing and pulling together the various pieces of knowledge and skills that had been imparted, whereas Mrs A set aside part of each lesson to review recently-taught skills and ideas and to relate these to previously-taught material.

Successful Task Performance. Both teachers demonstrated as they taught. Both showed the children how to perform the tasks they would be required to complete. Generally the children showed their understanding by performing as intended, but Mrs P's pupils showed that her intentions had not always been made clear. They often requested further information, which sometimes culminated in recall of the group for further instruction.

Implications

ATTITUDES and beliefs, rather than teaching experience and intellectual knowledge, are the main influences on how teachers teach. Or so it has been said. Certainly ideas about what mathematics is, coupled with perceptions of their students, shape what teachers do. Mrs A, who enjoyed maths and saw it as a complex but useful subject, paid considerable attention to underlying meanings, linked tasks with her pupils' everyday experiences and taught with confidence and enthusiasm. Mrs P, who was less enthusiastic about mathematics, showed less confidence in her ability to teach it, restricted instruction more to computational aspects and less often related the skills to everyday needs.

From my research no clear causal relationships can be claimed. However, the associations I found between what happened in the classroom and the children's achievement were consistent with the literature on effective teaching. It may therefore be useful to note and apply the factors that were associated with superior achievement:

Time

The more time spent on a topic the more potential there is for learning. Avoid wasting instruction time in getting organised.

Organisation and Individual Attention

The more successful group at Austin school had less teacher contact time and experienced greater autonomy. The less successful group at Potter school had more of the teacher's time but were more disruptive and helpless. This cannot be taken to mean that less teacher attention gives better results. The Potter children may well have needed even more attention than they got. The children bring their own behaviour, some of it springing from their socio-economic background, to school. How that mixes with the personality and style of the teacher is always different. No single type of organisation is superior for all students.

Instructional Style

The 'skills' style is useful for teaching computation, but it is the 'meaning' style which allows children to adapt their skills to new situations. Mrs P's emphasis on skills seemed to prepare her students only for the types of tasks they had practised, whereas Mrs A's concentration on un-

derlying meanings was associated with higher scores for the untaught interpretation tasks. It seems likely that the Austin school children were able to apply their conceptual knowledge to the new tasks. In today's rapidly-changing society, where continual adaptation is necessary, the 'meaning' style provides high quality learning opportunities.

Clarity

Pupils can benefit if teachers use methods which have been found to promote understanding:

Continually assess pupils to discover the extent of their understanding of the concepts and processes taught so that further help can be given where it is needed.

Give individual help to aid particular children who have difficulty while others pursue activities that are beneficial to them.

Make links explicit so that the children make appropriate connections between pieces of knowledge. When they are left to make the desired associations for themselves many fail to do so or make alternative connections that are invalid.

Use plentiful demonstrations of actual or typical examples of set problems.

Identify and spend extra time on aspects of the work that are potentially (or actually) difficult for children to grasp.

Review previously-taught material before you present additional material.

Organise the pieces of knowledge that contribute to a particular topic so that the learner can see how they all fit together.

Notes

Ms Philippa L. Lane carried out this research whilst at the University of Canterbury. Her work can be found in her B.A. Hons. thesis kept by the University. Her contact address is 105 Woodbury St, Christchurch 4, New Zealand.

The recent New Zealand study which describes the numerical abilities of children on entry to school, and which was the forerunner of this project, is written up in 'Number Skills in Junior Classrooms' in *set* No. 2, 1988. Full explanation is given in

Young-Loveridge, Jennifer M. (1987) *The development of children's number concepts*, Education Department, University of Canterbury, Research Report No. 87-1.

Problems that children encounter with the highly symbolic system of formal mathematics are discussed in

Carpenter, T.P., Herbert, J. and Moser, J.M. (1983) The effect of instruction on children's solutions of addition and subtraction word problems, *Education Studies in Mathematics*, Vol. 14, pp. 55-72.

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Hiebert, J. (1984) Children's mathematics learning: The struggle to link form and understanding, *The Elementary School Journal*, Vol. 84, No. 5, pp. 497-513.

and

Hughes, M. (1986) *Children and Number: Difficulties in Learning Mathematics*, Oxford: Basil Blackwell.

That teachers have an effect on children's learning is detailed in

Good, T.L., Biddle, J.J. and Brophy, J.E. (1975) *Teachers Make A Difference*, New York: Holt, Rinehart and Winston.

and

Powell, M. and Beard, J.W. (1984) *Teacher Effectiveness: An Annotated Bibliography and Guide to Research*, New York: Garland.

Good and colleagues, above, found that not only do teachers condition students, but students also condition teachers' behaviour. This is also mentioned in

Brophy, J.E. (1976) Reflections on research in elementary schools, *Journal of Teacher Education*, Vol. 27, No. 1, pp. 5-13.

Comprehensive coverage of skill- and meaning-based teaching and their consequences can be found in

Labinowicz, E. (1985) *Learning from Children: New Beginnings for Teaching Numerical Thinking, A Piagetian Approach*, California: Addison-Wesley.

This book is also recommended for its practical child-based approach to the teaching of numerical concepts and skills.

The factors which were included in the measurement of teacher clarity were extracted from a number of sources including

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and

Cruickshank, D.R. (1985) Applying research on teacher clarity, *Journal of Teacher Education*, March-April, pp. 44-48.

and

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and

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and

Sudvam, M.N. (1985) The role of review in mathematics instruction, *Arithmetic Teacher*, Vol. 33, No. 1, p. 26.

The effects of teacher attitudes and beliefs on their teaching behaviour are described in

Barr, R. (1988) Conditions influencing content taught in nine fourth-grade mathematics classrooms, *The Elementary School Journal*, Vol. 88, No. 4, pp. 387-411.

and

Fey, J. (1970) Classroom teaching of mathematics, *Review of Educational Research*, Vol. 39, No. 4, pp. 535-551.

and

Thompson, A.G. (1984) The relationship of teachers' conceptions of mathematics and mathematics teaching to instructional practice, *Educational Studies in Mathematics*, Vol. 15, pp. 105-127.

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Teenage Perceptions in a Still Nuclear Age

An Up-date, 1989

Greta Barnhart-Thomson
St Andrew's College, Christchurch

Some found these issues too stressful to think about
Teacher's comment

BACK IN 1985 Kevin McSweeny reported in ***set*** No.2, Item 14, that in his quite average high school 88 percent of the students felt that there would be a nuclear war in their lifetimes. The girls were more fearful than the boys. Half of these young people expected that the result of a nuclear war would be total destruction. Only farmers' sons were strongly of the opinion that deterrence would prevent a nuclear war. Only 2 percent could imagine any justification for a nuclear war. Twenty percent of the boys could imagine a 'conventional' war being justified, but only 3 percent of the girls.

At the same time I was making my own survey, *Adolescent Response in a Nuclear Age: An Exploratory Study*, but probing deeper into the fears and hopes of adolescents. I found that 83 percent (aged 13 to 18) felt that there would quite likely be a nuclear war in their lifetimes with 50 percent expecting the worst scenario. The girls were more fearful than the boys but they also believed that they could ***do*** something about it. It is notable that 67 percent of these young people were angry and incensed (not just fearful and helpless) about the world situation. Given a broader perspective, nuclear war was foremost on their minds. One girl said

> The building up of arms just *provokes* war. We need to support the United Nations to achieve a nuclear disarmament. It only takes one country like us to start a trend.

There have been many studies of the sceptical/cynical/despairing/fearful attitudes of youth which point in the same direction. Some of these are mentioned in the notes at the end of this item. But the world has changed. The threat of superpower confrontation has changed. The political shape of Europe has changed. Have young people's opinions and fears changed? It has been suggested that the generation gap is now spaced at mere five year intervals! Therefore, I set out to do a short follow-up study.

The follow-up

In April 1989, when *peristroika* and *glastnost* were well under way, when the INF Treaty had begun the elimination of one class of nuclear weapons – those at Greenham Common – when Poland and Hungary were changing their governments, but before the collapse of the Communist governments in East Germany, Czechoslovakia, Rumania and Bulgaria and before the Berlin Wall went down, I asked 96 girls and 89 boys in four secondary schools just four open-ended questions. The first two asked what they hoped would happen, the second two asked that they feared might happen.

The results

The hopes of these adolescents mostly concerned personal desires for: good school and exam marks, a good-looking spouse, a flash car, a nice home, success in a career, children, a long life.

The fears of the same young people were focussed on concerns about the world, mainly to do with war. The two questions asked what they were most concerned or fearful about happening in the next 5 years, and what they were most concerned or fearful about happening in their lifetimes. The answers they gave were not directed – there were no boxes to tick nor yes/no responses involved. But 72 percent were fearful of war or a nuclear war in their lifetimes and 48 percent fearful of a major war in the next five years.

Table 1
Proportion of students believing that a major war will occur

	A major war will occur within 5 years %	A major war will occur within my lifetime %
Girls school	57	80
Boys school	44	75
Co-educational school	49	73
Co-educational school	41	60
Average	48	72

Typical responses

I am mostly concerned about

> the world blowing up due to war (girl, 15)
>
> the world getting 'nuked' (boy, 15)
>
> the after-effects of a nuclear war. I haven't had a chance to live yet. All the old people don't need to live any longer – and they are the ones who will push the button. (boy, 16)
>
> World War 3 (nuclear war) and *surviving* it (boy, 16)
>
> all the nuclear weapons in this world (girl, 13)
>
> America and Russia with their new bombs and things that can DAMAGE THE WHOLE WORLD in one blow (girl, 14)
>
> the government buying frigates – putting New Zealand on the map as a target to be blown up by the Russians or Americans – and the rotting from radiation poisoning as an after-effect (girl, 17).

The homogeneity of views from different age groups as well as backgrounds was notable. There was only a slight difference (not statistically significant) between boys' and

girls' fears of war. Both were very knowledgable of the issues. A 15-year-old girl wrote:

> I am relatively pessimistic about the future and feel that it would only take a single 'press of the button' to start the annihilation of the earth. Many people I have spoken to agree with me in that they would definitely not want to survive a nuclear war.
>
> What seems so unfair is that it will be only one country that starts the war, thus inflicting it on other 'innocent' nations. I think the country that starts the nuclear holocaust is *selfish* and *cruel* for causing the ban of the world.

It must be said that the majority of the young people with hopeful expectations (58 percent) were more concerned with personal issues: with school performance, with career plans and with future directions for themselves, particularly when considering just the next five years. And their fearful concerns can be temporary: one 17-year-old wrote that her greatest concern over the next five years was the extinction of the mountain gorilla – the film *Gorillas in the Mist* was playing at the time. However, when asked about their whole lives they shift to world concerns, making a conscious move away from self-centred issues. The overriding consensus was one of concern. A teacher attached a cover note to the questionnaires which she returned:

Some found these issues too stressful to think about.

Discussion

Within hours of the space shuttle Challenger exploding, American psychologists went into action to assess how the tragedy affected the nation's children. There had been a teacher aboard. The expectation was that shock and a deep sense of sadness would prevail and that fears might abound. Initially, however, reports indicated that kids were 'coping' well and that their only bewilderment was why the questions were being put to them in the first place. Similarly, after the Chernobyl disaster, there was no 'strong' reaction in Finland in spite of people's proximity to the fallout, as well as the fact that Finland also has nuclear power plants.

Do these reactions suggest that we, and young people in particular, have in-built mechanisms for coping with life-threatening situations? It has been suggested that when the threats become too disturbing we simply ignore them, a reaction named 'psychic numbing'. Although it is difficult to locate research dealing directly with this issue, findings in the USA during World War 2 reveal that when parents deny that the situation is threatening this only heightens the trauma in young people. Psychologists who have made case reports, and those looking at the effects of the Challenger disaster, recommend that adults should talk openly about issues involving death, actual or threatened.

In fact discussion about nuclear war has been found to *diminish* the popular belief among young people that war is like a natural catastrophe – and hence impossible to prevent – and to strengthen the idea that war and preparations for war are social processes which can be influenced by people. Through discussions young people can become affiliated with others also concerned about the issue. Anxiety about war is not disastrous, and at least two pieces of research have shown that young people who do worry about it, and have got to the position of feeling that they can do something about the prevention of war, tend to do better at school and generally are better adjusted than those who do not worry.

Young people are well aware of the threats to their lives. To avoid the issues is one trap; to make them seem overwhelming is the other. Comments such as the following could become common:

> I'm sick of everyone filling us with all sorts of crap about how we're gonna get nuked, or AIDS, and never find jobs and all have horrible lives.

Living in an age where there is the likelihood of horrible lives (and horrible deaths) requires that we work for change and take responsibility. As well as the threats of nuclear war, disease and unemployment, as mentioned by this adolescent, there is also the threat of ozone depletion, global warming, pollution, and the rape of natural resources. The challenge to us as teachers is to help children, as we help each other, to accept responsibility to work to reverse these threatening trends.

Notes

Mrs Greta Barnhart-Thomson is Senior Counsellor/Psychologist at St Andrew's College, Papanui Road, Christchurch, New Zealand. She gives special thanks to the Christchurch secondary schools who participated in this study.

Her original survey is

Barnhart-Thomson, G. (1986) *Adolescent response in a nuclear age: an exploratory study.* Christchurch: University of Canterbury. Unpublished thesis.

See also

Barnhart-Thomson, G. (1987) Teenage Perceptions in a Nuclear Age. *New Zealand Family Physician* 14, 60-63.

Studies of the sceptical/cynical/despairing/fearful attitudes of adolescents in the recent past include

Beardslee, W. and Mack, J. (1983) The impact on children and adolescents of nuclear developments. *Psychosocial Aspects of Nuclear Developments*, Task Force Report No 20. Washington DC: American Psychiatric Association.

and

Chivian, E. and Mack, J. (1985) Soviet children and the threat of nuclear war: a preliminary study. *American Journal of Orthopsychiatry*, 55 (4) 484-502.

and

Gray, B. and Valentine, J.J. (1984) Nuclear war: the knowledge and attitudes of New Zealand secondary children. *New Zealand Family Physician*, 11 (3) 121-123.

The suggestion that the generation gap is now five years comes from

Taylor, B. (1989) Paper in private circulation. Wellington: NZ Department of Health.

Psychologists reports on children's initial reactions to the Challenger disaster include

Williams, J.E. (1986) Paper in private circulation. Winston-Salem, North Carolina: Wake Forest University.

A report on reactions in Finland to Chernobyl is

Rimpela, M. (1986) Paper in private circulation. Helsinki: Department of Public Health Science, University of Helsinki.

For 'psychic numbing' see

Lifton, R.J. (1982) Beyond nuclear numbing, *Teachers' College Record* (84) 15.

Research in the USA during WW2 on parents denying threats includes

Baider, L. and Rosenfeld, E. (1974) Effects of parental fears on children in wartime. *Social Casework*, 55, 497-503.

That discussion diminishes the idea that war is like natural catastrophes is discussed in

Engelstrom, Y. (1978), War in the imagination of Finnish school children. *Current Research on Peace and Violence*, 1: 91-103.

That young people who worry about war are often better adjusted than those who do not is detailed in

Goldenring, J.M. and Doctor, R.M. (1984) Californian adolescents' concerns about the threat of nuclear war. *Proceedings of the 4th Congress of the International Physicians for the Prevention of Nuclear War.*

and

Sommers, F.G. and Goldberg, S. et al. (1985) The nuclear threat and Canadian children. *Canadian Journal of Public Health* 76, 154-156.

That young people are well aware of the threats to their lives is discussed in

Solantus, T. and Chivian, E. et al. (eds) (1985) *Impact of the threat of nuclear war on children and adolescents. Proceedings of an international research symposium.* Boston: International Physicians for the Prevention of Nuclear War.

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set research information for teachers
number two 1990

'I only think of the men... I don't think of the women'

Adrienne Alton-Lee, Prue Densem and Graham Nuthall
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Teacher

THERE IS GROWING EVIDENCE that classroom processes work in powerful ways to favour children by gender, race and social class. These processes work in ways of which even those involved, both teachers and pupils, are not aware. In this *set* item we focus on gender-bias in the content of what children experience in classrooms. We report the results of analyses of the way in which the formal curriculum becomes a gender-biased reality in the classroom.

Research has already shown that patterns of classroom interaction and school textbooks are significantly gender-biased.

Classroom Interaction

In 1988, Alison Kelly analyzed 81 separate studies of gender-bias in patterns of classroom interaction which ranged from a detailed study of a single classroom to a survey of 102 classrooms. Her analyses made it clear that teachers consistently interact more with boys than with girls, although they may claim that they treat and wish to treat both sexes the same way. Karen Newton reported a study of participation patterns in Auckland junior school classrooms. One teacher who was personally 'concerned and committed to giving girls a fair go' believed that in her classroom 85% of the girls and 75% of the boys typically contributed to class discussion. Observations showed that in fact girls initiated only 18% of public interactions while boys initiated 82%. Of public interactions initiated by the teacher only 15% were initiated with girls and 85% were initiated with boys.

Textbooks

The extent of gender-bias in school texts has been well-documented world-wide. Recent research has begun to show the impact that sexist texts have on children. For example, male generic language ('man' or 'he' to denote people in general or gender unknown) is unconsciously perceived by children and adults to refer to men and not women. When asked to imagine the people referred to by male generic language, they report the image of a male and rarely a female.

Over the past two years we have set our first year university students the task of analyzing the gender characteristics of recently published secondary science texts used in New Zealand secondary schools. An analysis of the first chapter of Deborah Epp's *School Certificate Science: Physics* showed that where the gender of a person was mentioned, only 18% were female and 82% were male. Only three of the 34 persons depicted in illustrations were distinguishably female. Systematic analysis of the first chapter of an apparently non-sexist new fourth form text (*Active Science 1* by Grieve & Ball) showed females were mentioned or depicted in illustrations less than a third as frequently as males.

Curriculum

So far, however, there has been little research on how children actually experience gender-bias in the school curriculum. Dale Spender has argued that girls and women have been largely invisible in the curriculum, and where they have been visible, the representations have been

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largely demeaning or derogatory. She claims that the curriculum is made up of knowledge generated by white men about white men. She goes on to claim that the effect of this curriculum is so universal and so profound that we have come to perceive male knowledge as normal and appropriate in an unquestioned way. Spender concludes that we can no longer trust what we know.

Three years ago we tested Spender's claims in relation to the curriculum *actually experienced by children* – not just the materials or the texts that were available to the teacher and children, but the actual minute by minute verbal and visual content experienced in classrooms. We used data gathered about the learning of nine-year-old and eleven-year-old children for our major research project called *Understanding Learning and Teaching*. We were motivated to carry out a gender analysis of the data because we initially believed Spender's claims may have been exaggerated. Systematic analyses indicated that Spender's claims may have been conservative!

What we did

We selected the two studies which focused on people as curriculum content: Study 2 (a unit on the English middle ages with nine-year-old children) and Study 3 (a unit called 'New York City: A Study of Cultural Differences' with eleven-year-old children). The unit topics had been decided upon by the teachers and were also taught by other teachers in both schools.

We analyzed transcripts of continuous observations and audio recordings of class lessons, individual work and group tasks. All the work the children did in their books and all curricula resources including worksheets, books, photographs, filmstrips and so on were included in the analysis.

Every mention of, or reference to, a human being in the written or spoken data was classifed under three categories: (1) 'people' (as a gender unspecified term, potentially inclusive of males and females); (2) 'male'; (3) 'female'. Pronouns were included in the analysis. Each mention, whether plural or singular, was counted only once. Details of the roles and actions of each character or groups of characters were also recorded. Tests and in-depth interviews were used to explore what the children had learned from what they had experienced. These were conducted a week or two after the units as part of the *Understanding Learning and Teaching Project*. More tests and interviews were carried out one year later.

What we found

As can be seen in Tables 1 and 2, the strongest pattern is the invisibility of women. On average, every minute of class time during the *Middle Ages* unit, the children were exposed to three to four mentions of males. Compare this to one mention of a female every six minutes. During the *New York* unit there were, on average, two mentions of males very minute and one mention of a female every seven to eight minutes.

Table 1
Gender References in a Curriculum Unit The Middle Ages *in a Standard 3 (Year 4) Class*
(Total Unit Time: 52 hours 22 minutes)

Gender	Number of Mentions	Percentages
People (Generic)	1,883	14.4
Males	10,637	81.7
Females	507	3.9
TOTAL	13,027	100.0

Table 2
Gender References in a Curriculum Unit New York: Cultural Differences *in a Form 1 (Year 6) Class*
(Total Unit Time: 6 hours 26 minutes)

Gender	Number of Mentions	Percentages
People (Generic)	1,253	60.2
Males	780	37.4
Females	50	2.4
TOTAL	2,083	100.0

A further analysis of the 50 mentions of women and girls in the *New York* unit revealed that 24 of those were peripheral to the central focus on a male. Twelve involved mentions of a little boy's girlfriend in a story – she was never present except in his thoughts and conversations. Three were mentions of mothers of men. Three were mentions of a cleaning lady who worked for the male subject. One was a mention of a drunk wife who displeased her husband, one was 'the other woman' in a child's father's life, and the last mention involved the observation that women are less successful than men at accomplishing suicide. Of the remaining 26 mentions of women, six involved the discussion of women in relation to parental failure, in 17 the woman was the subject but only in relation to men. Only three mentions were made of a woman without reference to her relation to a male. These were all of one woman who was mentioned because she died.

Analysis of the *Middle Ages* data has revealed the same pattern with 12.4% of the mentions of women being pejorative. In 42.4% of the mentions of women, they were in subordinate roles to men ('Brok and his good wife', 'the villeins' wives', 'Joan of Arc died for Christ').

The teachers

Both teachers of these units (one male and one female) were shocked when we showed them the curriculum analyses. Both were confronted with the unconscious and profound nature of sexism in the curriculum the children experienced. In the Middle Ages unit the teacher had introduced the topic by stating:

> We're going to be looking at people. How they lived in England during the Middle Ages, what they did and how they earned their living, what they ate, what happened when they were sick, who was rich and who was poor. All those sorts of things that happened in everyday life.

The Impact on Children

The interviews with the children revealed the impact of a curriculum that purports to be about people but is chiefly about men. Sam was asked by the interviewer to explain what the women did:

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Sam: They used to ... aw ... can't remember now, they used to um ... um ...

Interviewer: What about the women?

Sam: Walk up and down the castle trying to act beautiful. (Laugh) ...

Sam: Yeah, they thought they were great. And people used to go, 'Wow, you're so beautiful!'

Amy, a high achieving girl, explained why she did not know much about the lives of women during the Middle Ages:

Amy: Because in those days they'd be, well the barons and knights. There would be more about them there; not so much the women as they were not barons or knights or anything.

When the interviewer probed further Amy explained:

Amy: The Lady of the Manor was ... she was the daughter of some important man so that made her a lady or something like that.

Amy stated that she did not care about not learning about women and explained why:

Amy: Some women were serfs and we learnt about serfs anyway. So there is not much more you can learn.

When the third case study pupil, Kim an average-achieving boy, was asked in the interview to identify the name of the head person in a nunnery he replied:

Kim: Oh, I don't know. I've forgotten completely what a nunnery is.

When the interviewer probed further Kim added:

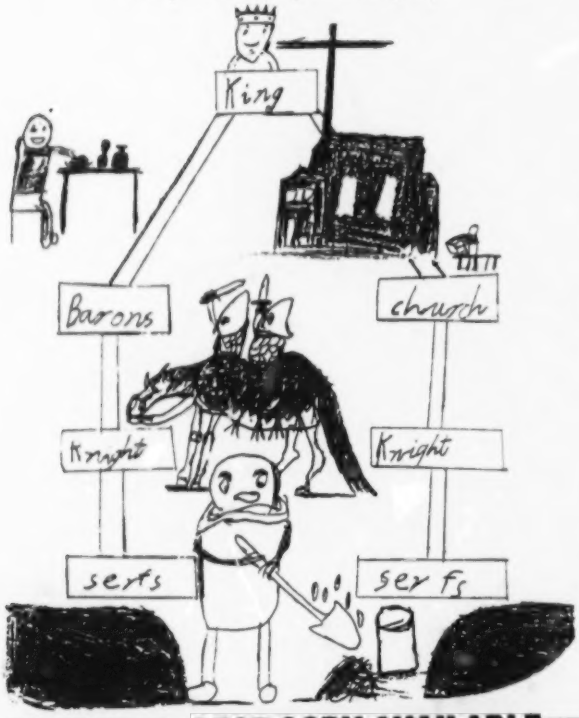
Oh I think it's something to do with a monastery

Interviewer: Did you learn about nuns when you studied the Middle Ages?

Kim: Monks – we learnt about monks.

The impact of this curriculum on Kim is best illustrated by his diagram of the feudal system – a society depicted entirely by men.

A diagram of the Medieval Feudal System drawn by Kim, a nine-year-old average-achieving boy.



There was also evidence that the focus on men undermined the little the pupils did learn about women and interfered with the children's learning from the intended curriculum. One of the few women mentioned during the *Middle Ages* unit was Joan of Arc. However, the children's responses to a multiple-choice test item about Joan of Arc showed that they predominantly attributed her accomplishments to William the Conqueror. Seven children out of the class of 33 selected William the Conqueror before the unit and maintained that response in spite of the unit. Fifteen out of the remaining 26 did not select William the Conqueror before the unit but incorrectly 'learned' that he fought the battles that ended the Hundred Years War. Six of those fifteen had correctly selected Joan of Arc *before* the unit. Four children recorded that they did not know the answer and four others selected Marco Polo or Francis of Assissi. Only three children out of 33 correctly attributed the accomplishment to Joan of Arc immediately after the unit. Out of the 23 children who were available for a test of long-term learning given one year later, none still selected Joan of Arc. Two of the three children who had selected Joan of Arc in the immediate post-test selected William the Conqueror a year later!

The impact of the curriculum focus on white males on the children who studied the *New York City* unit showed a similar pattern. The following excerpt reveals that Mia, a Pakeha girl, identified with the men who came from Europe to settle in New York. Mia was responding to a question about the settlement of New York:

Mia: I think it was the Indians. I think they were the first people to have it.

Interviewer (female): Mm?

Mia: Cause they just, see, you don't ... um Indians came before today sort of wearing all them facepaints and things. You sort of think of them being first there because they were there before us. You think Indians, and you think of long hair and headbands and weapons ...

Interviewer: And you say, you think of them being there before us?

Mia: Mm. (Nods)

Interviewer: And do you feel, when you say 'us', do you mean that the people who came to settle New York after the Indians were people like us?

Mia: Mm. Mm. (Nods)

Interviewer: How were they like us?

Mia: Well, they didn't wear um, war paint and carry weapons around. They just sort of had, they wore clothes like us, sort of (laughter), civilized clothes.

Interviewer: When you say 'us' do you think of women or men?

Mia: I think of men really, cause like, sort of early Canterbury you have visions of people wearing sort of long suits and things. You know, I don't really ... That's right. I only think of the men (giggle). I don't think of the women (giggle).

This excerpt is taken from an interview carried out a year after the unit when Mia was twelve. Mia explained to the interviewer that she was a strong supporter of the 'Girls can do anything' campaign. The intonation of her voice and her laughter suggested that she surprised herself when she realized that the images in her mind were all of men. In spite of her apparently feminist beliefs she was powerfully affected by a curriculum that largely excluded

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Blacksmith

women. Her schema for storing historical material appeared to be exclusively male.

The Australian Commonwealth Schools Commission (1975) defined sexism as a 'process through which females and males not only progressively learn that different things are required and expected of them because of their sex, but learn those things in an unexamined way.' The data from the present study suggest that the process is not only unexamined but strongly hegemonic. *Hegemonic* is a term used to describe the process through which members of a subordinate group come to *collude* in, or unknowingly support, and maintain, their own subordination. Both teachers and pupils accept as normal and appropriate, a curriculum which excludes and systematically undervalues women.

Summary and Implications

What the children experienced:
Our evidence demonstrates that the children were exposed to a curriculum predominantly about white men and from the perspective of white men. The knowledge affirmed and commended male endeavour (predominantly that of conquering armies or colonists) and presented images of white males as strong, brave, pioneering and adventurous.

Our focus on the experienced curriculum (rather than just the texts or resource materials) suggests that educators may have markedly *under-estimated* the extent of sexism in what pupils experience.

The impact on children:
The evidence we now have provides clues to the seriousness of the impact on children of how they experience the curriculum. The children's acceptance of the subordinate status and the invisibility of women was apparent immediately after the unit and appeared to be even stronger a year later.

Perhaps the best evidence of the long-term impact of sexist curricula is the teachers' lack of awareness of the bias. We are all products of this kind of curriculum.

When we present the data from the *Middle Ages* study to university and College of Education students we use a series of slides of medieval paintings depicting women as soldiers, weavers, sculptors, farmers, surgeons, teachers, miners, mothers, masons, bakers, apothecaries, painters and so on. We do this because many students genuinely believe the myth that women did not make an important contribution to life in the English middle ages. The long-term impact of sexist curricula is very powerful. That women were mentioned even less frequently in the study of modern-day New York provides an important insight that sexism in class teaching is not just a matter of biased historical records.

Given the weight of the evidence the pressing need is to change both the curriculum materials and the way children experience the curriculum.

The Problem of Change

It is important not to underestimate the role of hegemony in confounding attempts to make changes. For boys and men the curricula focus on male activity can be affirming and empowering. For girls and women the hegemonic process leads them to collude in, and defend as normal, school curriculum that is sexist.

Sexism in education is very powerful but it is only one of the structured and hidden ways in which our thinking becomes gendered. For example, the social and economic structures that divide human activity into public and private spheres, paid and unpaid work, maintain fundamental beliefs about the different value of male and female contributions to our society. However, in schools, we, as teachers, administrators and parents can bring about changes. And as the Australian Commonwealth Schools Commission pointed out in 1975, 'Good education is necessarily non-sexist.'

Because we have come to think of the invisibility of girls and women as normal, *systematic procedures* and *training* are necessary to monitor and combat sexism in the curriculum. Because pupils have come to think of the invisibility of girls and women as normal they may resist the introduction of women and girls into curriculum. Therefore it is important that the introduction of non-sexist curricula is accompanied by counter-sexist strategies to educate children about sexism and the need for change.

Suggestions for strategies to help develop gender-equitable practice

Ensure that there is a spending policy that makes gender-balance a requirement for all new educational materials. There are charts to help staff analyse educational materials for gender balance at the end of this item. Affirmative action in purchasing will be necessary to counter-balance the overwhelmingly sexist effect of existing resources. Save the additional burden on school staff. Require publishers of educational materials to use systematic procedures at the development stage to ensure that all new publications are non-sexist and non-racist in language, content, and illustrations. Publishers' Guidelines for non-sexist materials in education are available (e.g., the *McGraw-Hill Guidelines*) Teacher-made curriculum resources are often best suited to the educational needs of the children. Ensure staff have relief time and financial support to develop gender-balanced resources.

Put a priority on gender equity training for school staff. Overseas research suggests that equity training for teachers is critical to the success of even modest gender-equity initiatives.

New Zealand schools, when implementing the 'Taking Action' plan in *Governing Schools: A Practical Handbook for School Trustees* should ensure that all strategies address curriculum as well as other areas of gender equity.

Principals

1. Make a priority of equity training for staff. There are many competing demands on staff training. However, equity training is critical both because there is a problem seeing the problem and because the effectiveness of any other equity resource is dependent upon teachers.

2. Ensure that the responsibility for the development of equity policy or programmes does not fall on one isolated staff member. The need for inter-staff support is highlighted in overseas reports. In larger schools, ensure that equity

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working groups involve staff who work at each age level, or staff from each Department.

3. If the school has an equity working group, provide opportunities for them to consult with the rest of the staff to generate a workable plan to evaluate, modify, replace and develop curricula materials systematically. Encourage the working group to keep brief records of the gains made. Many staff can feel overwhelmed by the pervasiveness of sexism in curricula. Therefore it is important for the staff to establish a step-by-step plan that is practicable.

4. Facilitate opportunities and support for staff to carry out small-scale action research in the school. It is important for teachers to gather information about what is actually happening; important for them, and their pupils. The approach could be introduced as part of staff development within the school. There is an action research model in the *Countering Sexism in Education* handbook which could be put on to an overhead to initiate discussion at a staff meeting.

5. Carrying out analyses of curricula materials takes time. Teaching staff will need time to do it. They will also need assistance from other staff or assistants with whom they feel comfortable.

Teachers

1. Photocopy the coding pages we have provided and do your own analyses. Begin with curricula materials. Later use a tape recorder to provide data about the curriculum children experience. Collaborate with other staff. Take time to discuss the results of your analyses and brainstorm strategies that will be effective in your class. If you have the *Countering Sexism in Education* handbook, use and modify the procedures in it. Note: It is important to gather some data yourself and think through the implications before you raise the issues with students.

2. Initial attempts to introduce gender-balanced curriculum are typically resisted by both girls and boys. Be prepared for anger and resistance from children! Girls may resist focus on women and/or may suffer a backlash from angry boys. As a result of sexist curricula and other social processes, students undervalue curricula that focus upon girls and women. The strength of the resistance highlights the need for change. Because of the resistance, gender equity initiatives should begin with *counter-sexist* rather than just *non-sexist* strategies. For example:

2.1 Begin by using the coding sheets (or adaptions) to get students systematically analyzing curricula materials. Like us, until they see it they are unlikely to believe it! Children do understand the concept of fairness.

2.2 Use exercises designed to expose the problems of sexist curricula. For example, use a simple exercise (before you introduce the topic) like asking the students to draw a scientist. Explore their conceptions of a scientist. It is important to alert children to the effects of male generic language. Ask pupils to draw pictures of early cavemen, policemen, 'the man in the street' etc. Choose male generic terms from resources in the school: textbooks, encyclopaedias, non-fiction references. The research shows that children predominantly interpret male generic language as male specific. Their pictures will reveal to you and them how they interpret male generic language. Try translating some male-generic language into female-generic and explore the ways in which language can exclude or stereotype females and males.

2.3 Use language which specifies both genders as often as possible. Saying 'he or she' may take slightly longer but the research suggests children are most likely to have gender-balanced associations when both genders are specified.

2.4 Use the action-research model in the *'Countering-Sexism in Education'* handbook as a guide for evaluation strategies to diagnose the impact of the changes on pupils. Girls may be harassed or abused in the course of the changes.

2.5 Ensure you have available images of women in a variety of roles and activities relevant to your topic. We have found even simple strategies such as showing images of the women who have won Nobel prizes for scientific work to have a powerful effect on first year University students. However, check that your images of women do not undervalue or exclude women's contribution of unpaid nurturing and household work. Overseas 'non-sexist' programmes featuring women in traditionally male activities only, have had an unintended but deeply troubling outcome: they have increased children's undervaluing of women's unpaid contribution to society.

2.6 Design for your pupils research tasks which focus upon women's lives and contribution to society. Prepare children for the detective work necessary to uncover information about women and use the problems they meet as a basis for discussion about the predominance of men in historical material. Train pupils to interview aunts, mothers, grandmothers and great grandmothers to gather their own historical material.

3. One of the greatest sources of frustration for counter-sexist practice is the considerable amount of work involved in locating curriculum resources that include and value women and girls. Photocopy and use the coding sheets to analyze existing resources for topics for which you are having most difficulty developing non-sexist resources. Use your analyses to support your need for funding and for time to develop adequate curricula resources. When you have money to purchase new materials beware of superficial changes that appear to be non-sexist (such as 'inserts' or 'adds-ons') but which continue to marginalize women.

4. Ensure that the resources you develop are equitable for race as well as gender. The aim is an 'inclusive curriculum' which involves *all* children and does not exclude particular groups.

Important Note:

The coding sheets we have provided should not be applied to fiction. Although general curriculum materials for social studies, science, mathematics etc., should be gender-balanced throughout, it is inappropriate to apply the same kinds of analyses to stories and novels. In the case of the school library a simple first step is to compare the number of books with female central characters and male central characters and apply affirmative action in library buying to redress the imbalance. Don't increase the number of stories with neuter characters. The immediate need is for an increase in female characters. There are lists available of excellent fiction books which present a positive image of women and girls. e.g., Book 2 of the *Combat Sexism Kit* published by Globe Press for the Australian Union of Students.

Sculptor

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Coding Chart

For gender analysis of the language in textbooks, other written material & audio tapes.
(Not for fiction)

Page No.	Gender specified			Gender Unspecified	Male-Generic	Female-Generic
	Female	Male	Both			
(Sub) Total						

Decide which categories you want to compare and turn the number in the category into a percentage of the total: $\frac{\text{number}}{\text{total}} \times \frac{100}{1}$

Definitions	
Gender specified – female	mentions the sex involved – *women, girls, she* . . .
Gender specified – male	– *men, boys, males, he,* . . . Plurals count as 1 mention.
Gender specified – both	explicitly both – *men and women, he and she* . . .
Gender unspecified	inclusive terms – *people, person, humankind, teacher* . . .
Male-generic	uses *he* and *man* for people in general, or refers to a person as *he* when the sex is unknown or irrelevant
Female-generic	uses *she*, or *woman*, similarly.

Tally each mention in the columns. Please adapt the chart to your own needs, e.g., you may want to analyse the roles and activities (as well as the mentions). Systematic analysis is time consuming. Try an analysis of a few randomly selected pages; you will soon have an *indication* of the degree of bias.

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Coding Chart

For gender analysis of text illustrations or visual resources.
(Not for fiction)

Page No.	Gender					
	Females		Males		Neutral or Indistinguishable	
	Number	Brief note on activities or roles	Number	Brief note on activities or roles	Number	Brief note on activities or roles
(Sub) Total						

Decide which categories you want to compare and turn the number in the category into a percentage of the total: $\frac{\text{number}}{\text{total}} \times \frac{100}{1}$
Look for stereotyping in the roles and activities.

Note: Coding photos showing large numbers of people is unreliable and time consuming. We suggest you analyse only photos with four or fewer people.

Masons

Notes

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Research and Development is needed to:

Develop resource indexes of the extent of gender imbalance in currently widely used curricula materials and texts.

Develop, network and distribute resource indexes of non-sexist curriculum materials and information about sources of non-sexist curricula and materials. (New Zealand has, for example the Kohia Resource Centre, Auckland Feminist Teachers *Newsletter*, and the Women's Advisory Committee on Education).

Evaluate the implementation of counter-sexist strategies and develop effective teaching methods and support strategies to promote gender equity.

Acknowledgements

The research which gave rise to this **set** item would not have been possible without the meticulous work of Valerie Ainsworth who carried out the quantitative analyses of gender.

We pay tribute to the teachers whose programmes we studied, for their commitment to children, for their openness to reflective practice, and their conviction that the findings should be published.

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Soldiers

The pictures of medieval women come from many 14th and 15th century books. We found these among many others beautifully reproduced in *The Medieval Woman, An Illuminated Book of Days*, by Sally Fox (Editor), a New York Graphic Society book, published by Little, Brown and Company, Boston, USA, 1985.

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set research information for teachers

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4. **School Climate:** Assessing and Improving School Environments
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5. **School Level Environment Questionnaire (SLEQ)**
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6. **Size, Costs, Curriculum in Secondary Schools**
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14. **Lessons from Mrs A. and Mrs P.**
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15. **Teenage Perceptions in a Still Nuclear Age**
    Greta Barnhart-Thomson
16. **'I Only Think of the Men... I Don't Think of the Women'**
    Adrienne Alton-Lee, Prue Densem, Graham Nuthall